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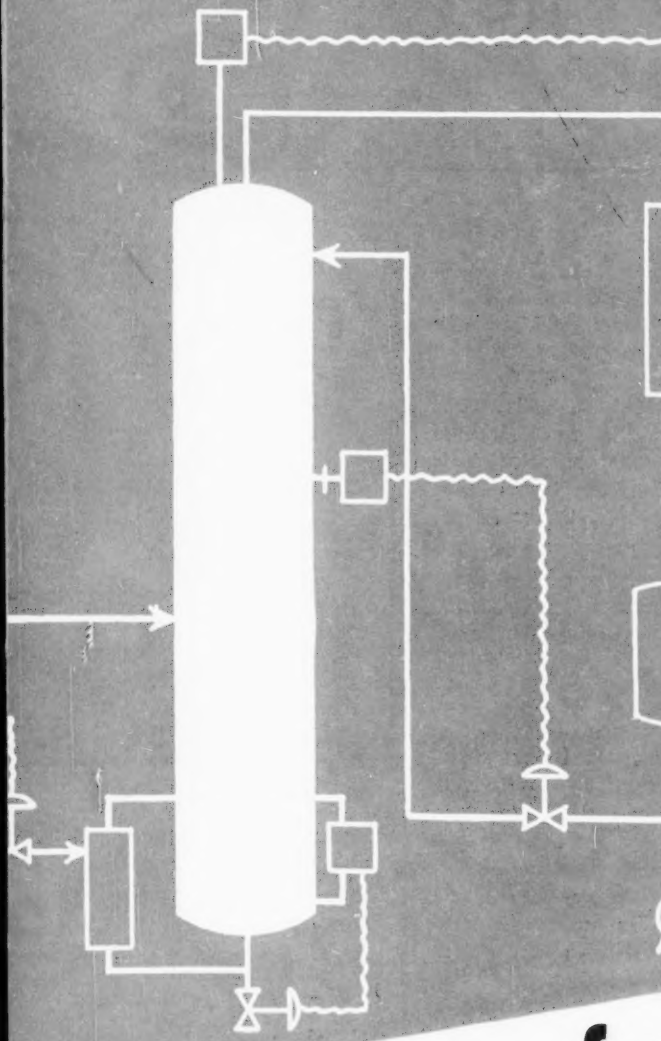
Chemical Week



Britain's petrochemical push will give U.S. makers stiffer battle in world markets p. 29

The natives are friendly— Princeton's lure to new labs. Here's who and why . . . p. 75

Maintenance inventories can be costly. Don't let them grow without control . . . . . p. 97

What price bag standards? Multiwall makers, users see savings in fewer sizes . p. 131

Instrumentation for profit . . . p. 59

February 21, 1959

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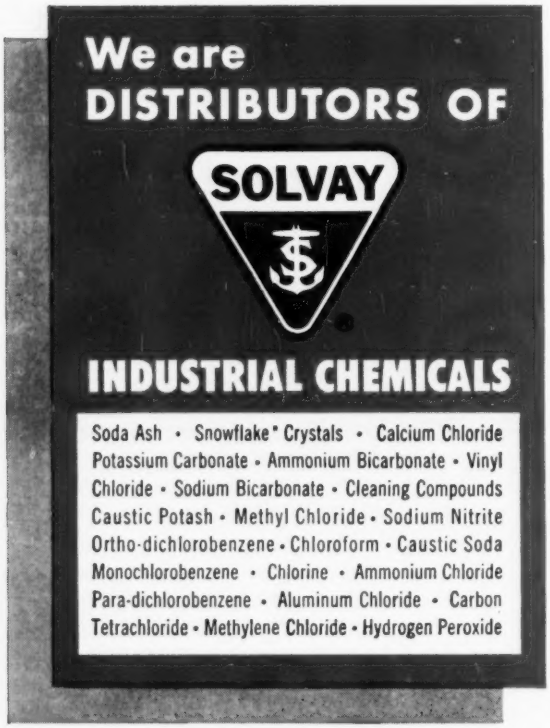

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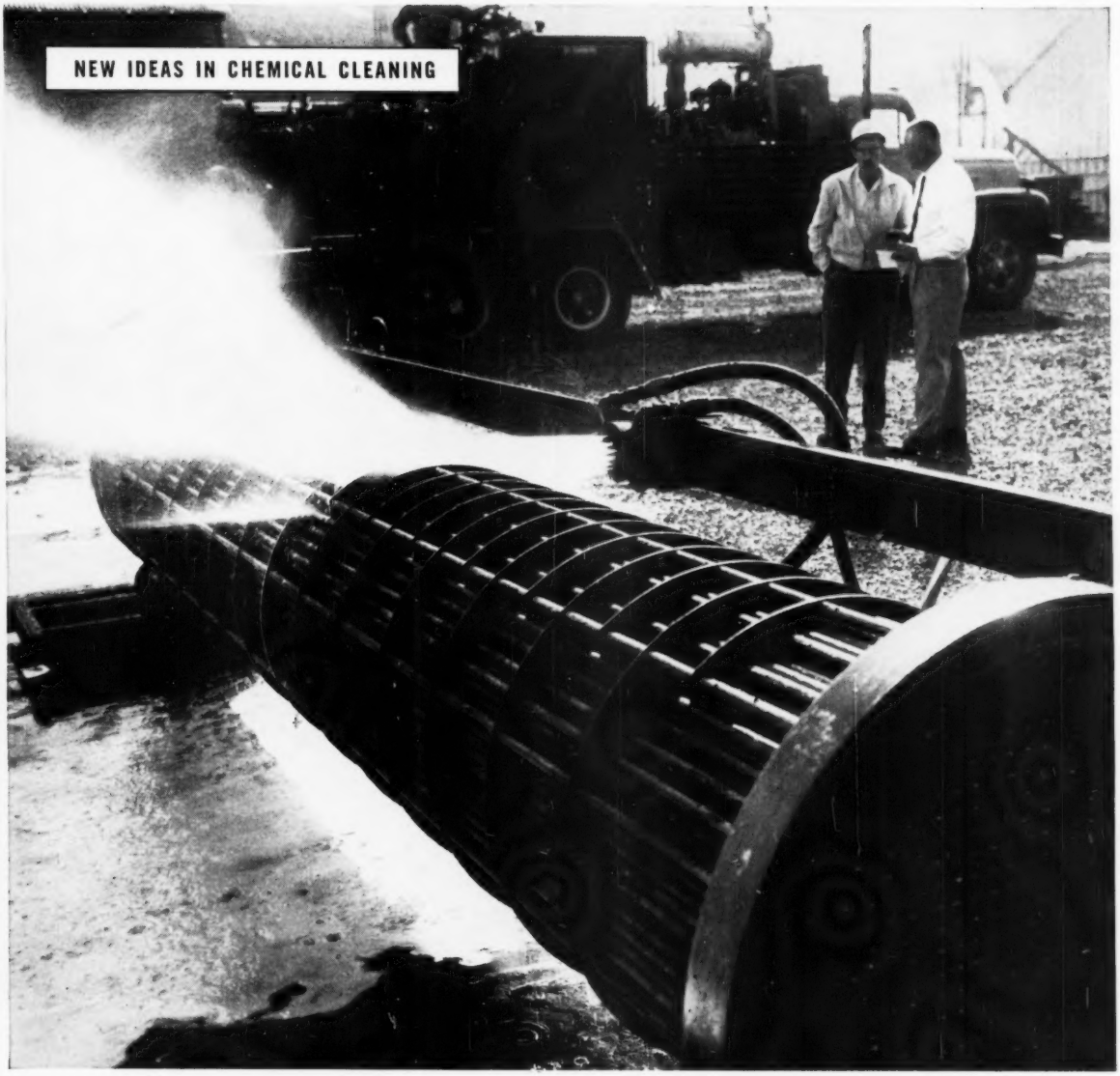

New Jetting Tool To Clean Tube Bundles Saves Thousands Of Dollars

The new high-pressure hydraulic tool, shown above, is currently saving thousands of dollars for companies in the refining, chemical, and petrochemical industries. It is the jetting tool developed by Dowell to remove deposits from heat exchanger tube bundles.

Previous methods of cleaning these bundles have been costly, time-consuming and often inadequate. Many times bundles had to be replaced completely because of the lack of a suitable cleaning method.

This new Dowell tool has a remarkable record of thorough, fast cleaning. For example, a slurry reboiler exchanger bundle, three feet in diameter and 16 feet long, was fouled with deposits of coke and asphalt. After being jetted from only one side, the bundle was thoroughly clean. Time required: less than one hour.

The tool holds the bundle in place for cleaning and has flanged rollers for rotation. The jet-head is manipulated automatically so that all tube spaces are covered. The jetted liquid can be either water or chemical solvents.

This high-velocity jetting device is another example of the new ideas Dowell continues to offer in chemical cleaning to help you cut your costs. Whatever the cleaning problem in your plant, call Dowell for an engineered recommendation. Dowell — the largest, the oldest, the most experienced chemical cleaning service — Tulsa 1, Oklahoma; and 165 stations and offices in major industrial centers.

Chemical cleaning service for all industry DOWELL

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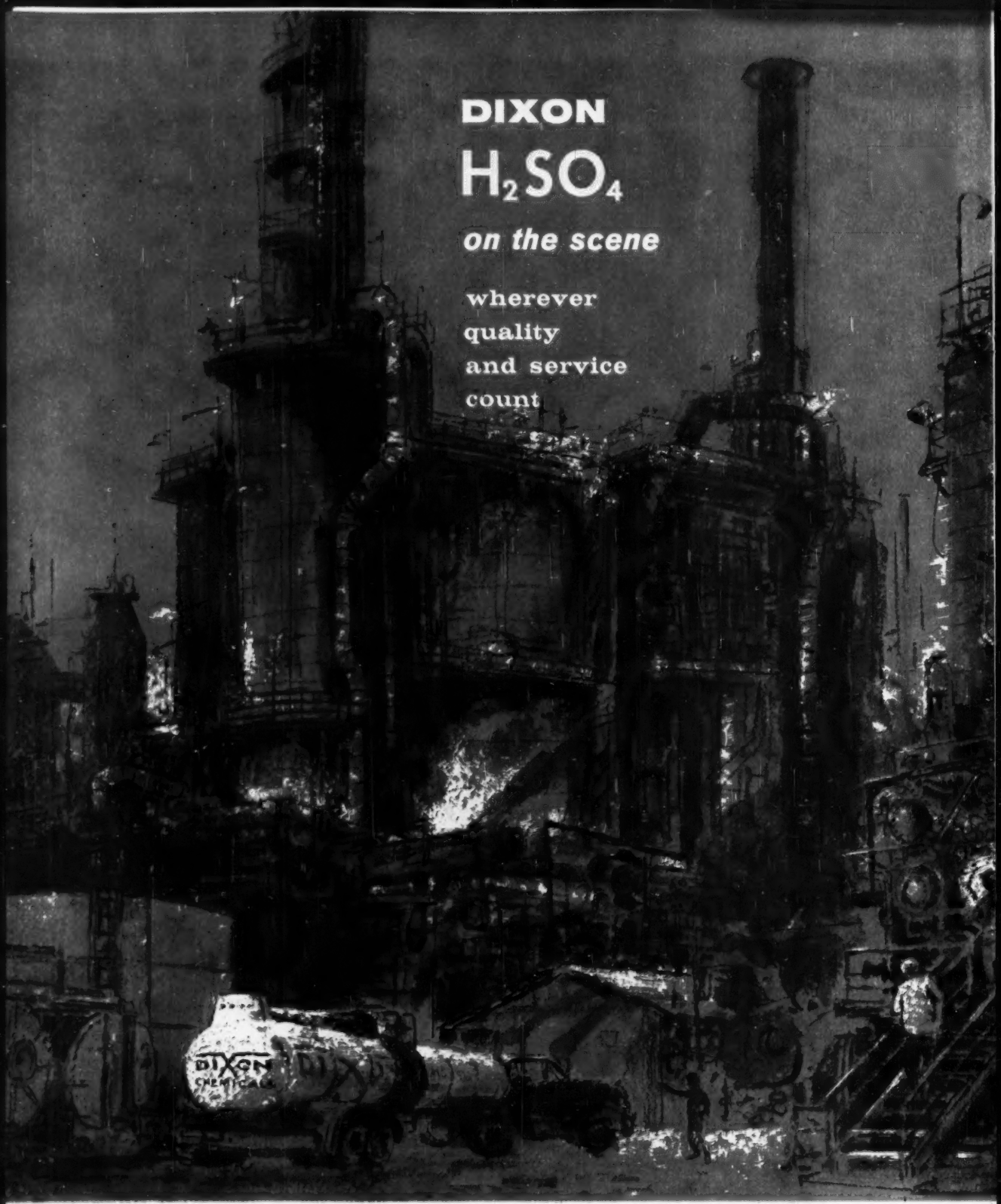

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CHEMICALS

Chemical Week

TOP OF THE WEEK

FEBRUARY 21, 1959

SEC moves to prevent "premature" and "unofficial" disclosures on stock issues. Recent price run-ups on two small chemical stocks are involved ..... **p. 33**

Emery Industries looks beyond fatty acids for its future growth. Here's how the 119-year-old company is diversifying .. **p. 43**

How much growth ahead for phenol? Current producers ask the question as two major consumers build captive plants . **p. 89**

42,580 copies of this issue printed

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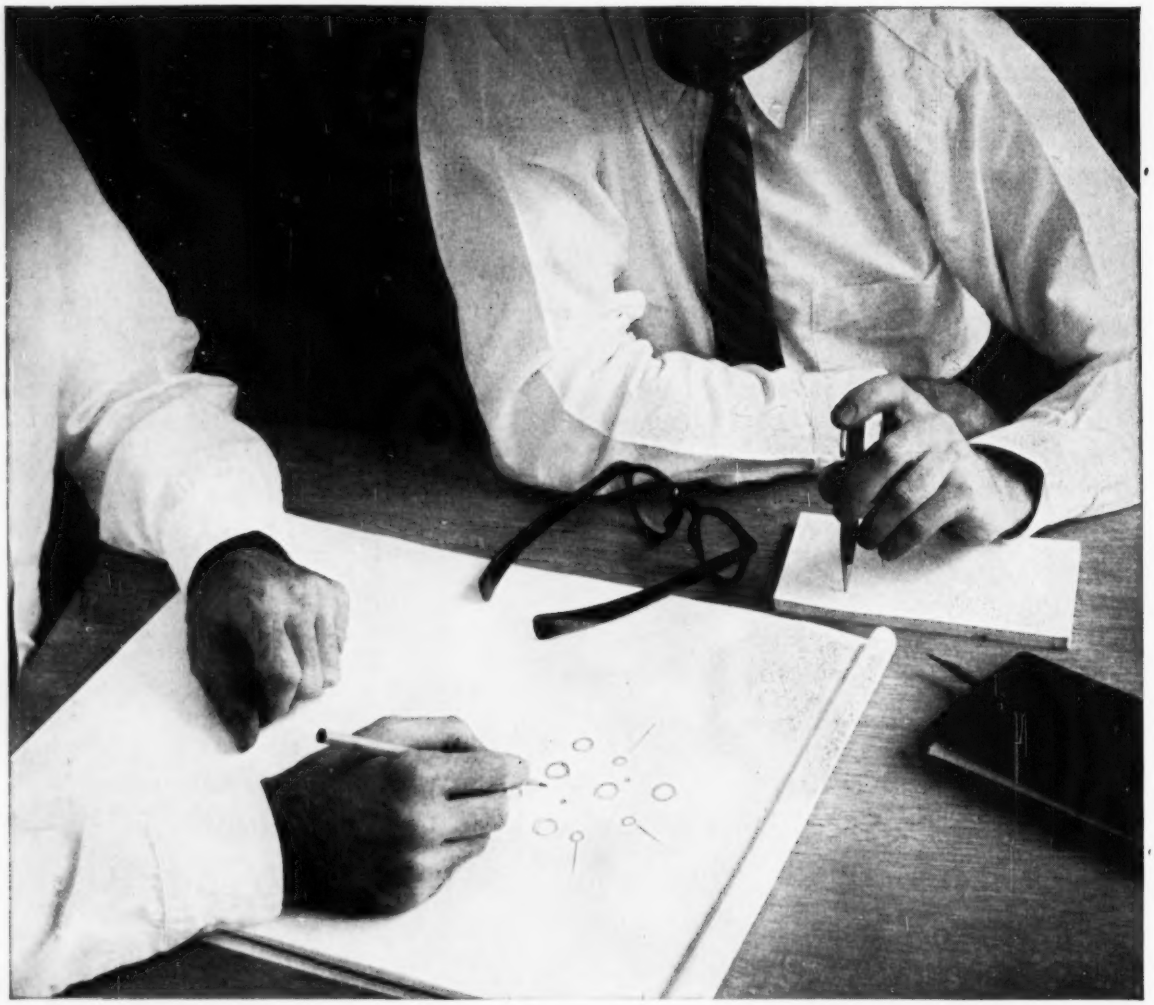

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Take a unique product like lithium . . . add about 13,000 handy chemical, physical, and metallurgical references . . . stir in a few dozen well-seasoned scientists . . . add a dash of urgency and a few well-nigh insurmountable problems . . . then simmer for long hours, days, weeks, months, and years . . . in the laboratory, at the conference table, in the corridors, over coffee, on the way home . . . just about anywhere!—and you'll come mighty close to the way the men at Foote Research make lithium a living and growing reality in chemistry, metallurgy, ceramics, nuclear energy, and other industries.

You can share in this living reality by investigating the possibilities of using lithium in *your* product or process. Your queries will be reviewed by men who know the facts and know a good bit about applying them. An ideal way to get your investigation started is to write for *Chemical and Physical Properties of Lithium Compounds.* This informative data book is available on request to Technical Literature Department, Foote Mineral Company, 420 Eighteen W. Chelten Bldg., Phila. 44, Pa.

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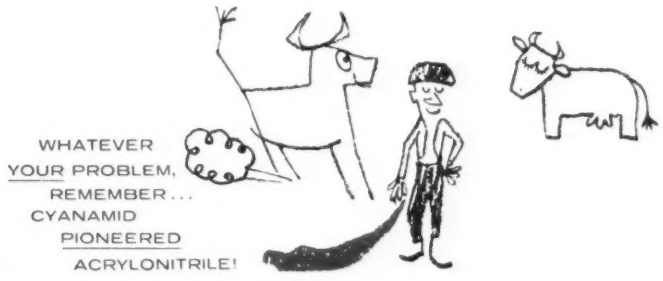

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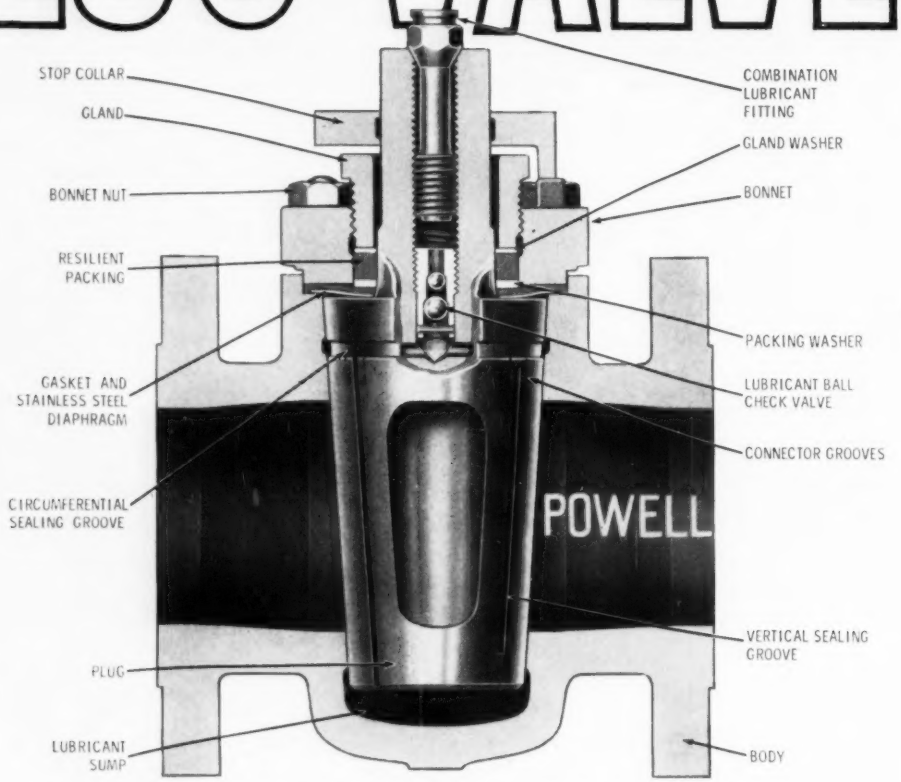
LUBRICATED PLUG VALVES



Sectional view Powell Screwed Gland Lubricated Plug Valve.

Like all Powell Valves, Powell Lubricated Plug Valves are superior in their field . . . and have many advantages over other conventional types of Valves.

- Simple design: only three basic parts—Body, Bonnet, Plug.
- Quick, complete shut-off—a quarter turn will close or open the valve.
- Tapered Plug assures positive seating.
- Machined surfaces of plug and body are not exposed in the open position. Any media adhering to the plug when in the closed position is removed when plug is rotated.
- Cavity-free straight passage assures streamlined flow in either direction. Scale and sediment cannot collect.

Powell Lubricated Plug Valves are available in sizes ½" through 16", depending on the type required—Semi-steel 175 and 200 pounds WOG;—Carbon Steel ASA 150 and 300 pounds.

Powell can also furnish Lubricated Plug Valves in other alloys on special order.

For all your valve needs, make it a policy to consult your local Powell Distributor—or write directly to us.

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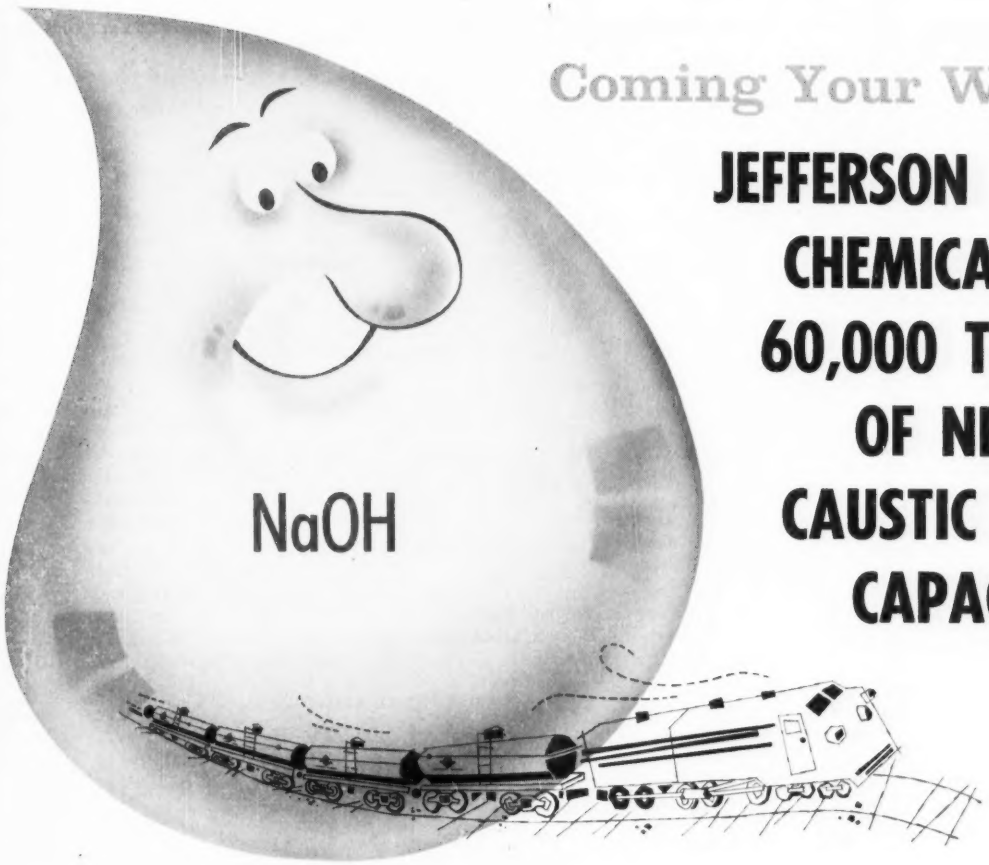
Dependable Valves Since 1846 • Cincinnati 22, Ohio



Coming Your Way...

JEFFERSON CHEMICAL'S 60,000 TONS OF NEW CAUSTIC SODA CAPACITY

Caustic Soda from Jefferson Chemical's new 60,000-ton/year chlor-alkali plant in Port Neches, Texas, is now moving by road, rail and water to national markets. Production from this new facility adds to Jefferson's line of heavy inorganics and completes a two-year expansion program designed to increase the company's output of a wide variety of essential petrochemicals.

Caustic sales and service are co-ordinated by Jefferson's experienced Alkali Division. Available grades are 50% and 73% liquid. In planning to meet your requirements for caustic soda, caustic potash, soda ash and sodium bicarbonate, consult your Jefferson Alkali Sales Division representative or write direct to Jefferson Chemical Company, 1121 Walker Avenue, Houston 2, Texas.

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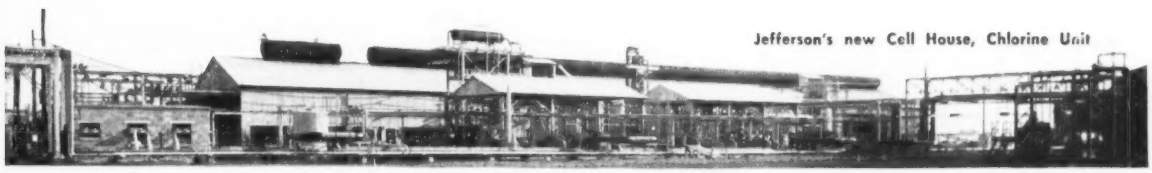

Jefferson's new Cell House, Chlorine Unit

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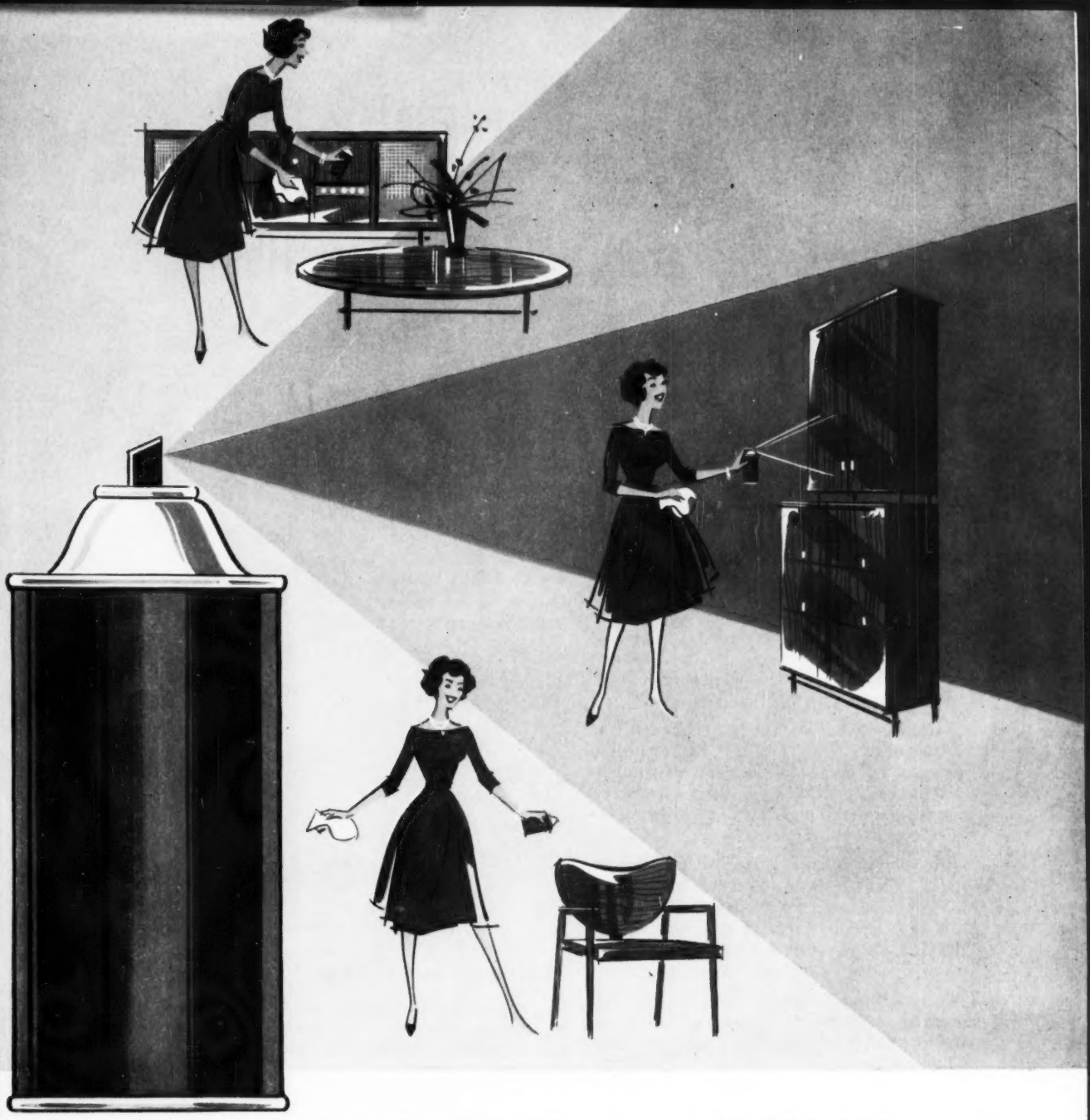

Newest packaging idea in a $13,800,000 market

Today, a new package can become the major selling point for a product if it makes the product easier to use. After revolutionizing sales for hair fixatives, colognes, insecticides and a host of other products, aerosols are the newest packaging idea to sweep into the $13,800,000 furniture-polish market.

The reasons for this success are simple. Aerosols deliver the product in a completely new form—a form that's easier, more effective and often more economical to use. If your product can be brushed, poured or sprayed, you stand a good chance to add new sales appeal—create vast, new markets—if you package it in an aerosol.

It is not necessary to set up your own packaging line to enter this field. A custom filler near you has the knowledge and equipment to help. He can package your formulation for testing and help you in all phases—from planning through production.

If you don't know the name of a custom filler, write Du Pont. We'll send you a list and include survey data on your market for aerosol products, plus information about Freon* propellents for aerosols. "Freon" is preferred by custom fillers and is used in more of today's aerosols than any other propellent. Write: E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Division 332, Wilmington 98, Delaware.

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Using Salt Efficiently

by INTERNATIONAL SALT COMPANY, INC.

New Evaporated Salt Dissolver Has Five Important Advantages

Here's good news for every user of evaporated salt brine! A new Sterling Evaporated Salt Dissolver developed by International Salt Company is available in a full range of capacities to suit special plant requirements. The equipment features an exclusive new hopper, a float chamber with hydrostatic head, tough plastic construction, and by far the highest flow ratings yet achieved in dissolvers of similar size.

1. New custom designs. The Sterling Evaporated Salt Dissolver is available in standard sizes of 30″, 36″, 48″ and 60″ diameter, and in larger sizes to meet custom requirements. International also offers plans for converting existing tanks or other plant equipment into salt dissolver service.

2. Exclusive new hopper. The Sterling Evaporated Salt Dissolver's remarkable new hopper insures free salt flow, even under high-humidity conditions. Besides increasing salt storage space, the hopper permits adding salt without lowering the liquid level in the dissolver—a valuable timesaver.

3. Precision-engineered float chamber. Unique system* prevents undissolved salt crystals or brine in the dissolver itself from flowing up into the float chamber. Resulting "one-way traffic" eliminates salt recrystallization, which could otherwise impede the free action of the float valve.

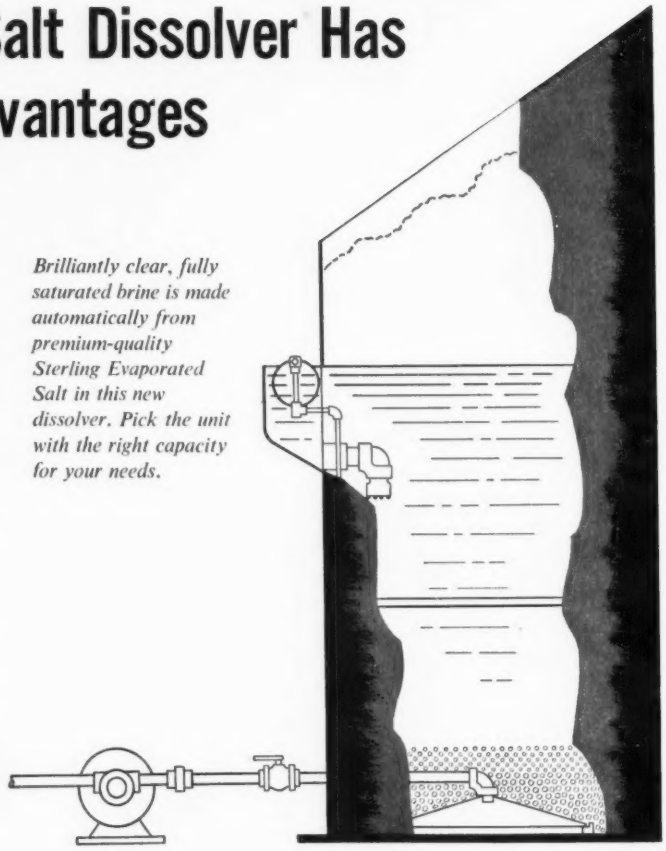
4. Corrosion-proof plastic used in the new dissolver is acceptable to the Food and Drug Administration of the U.S. Department of Health, Education and Welfare and to the Meat Inspection Division, U.S. Department of Agriculture, for use in food processing equipment.

5. High capacity. In-plant performance has already proved over and over that the new standard 36″ x 48″ Sterling Evaporated Salt Dissolver will deliver in excess of 900 to 1,200 gallons of saturated brine per hour. The only limiting factors are the capacity of the pump and provisions for adding salt to the dissolver.

If you'd like engineering help in deciding on the best Sterling Evaporated Salt Dissolver for your specific needs, contact International Salt Company. An expert Sterling sales engineer will gladly work with you or your plant engineer to determine the right dissolver capacity and location, functional piping layouts, etc.

*PATENTS PENDING

Brilliantly clear, fully saturated brine is made automatically from premium-quality Sterling Evaporated Salt in this new dissolver. Pick the unit with the right capacity for your needs.



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"Now let's see," replied Bradshaw, the blue-blooded bottling baron, "I hold their bottle up to my right eye and our bottle to my left and . . . you're right Smathers I can see through theirs much better."

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"You know, Smathers, Pfizer GLUCONATES sure can clean up the bottle-washing picture."

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For really sparkling bottles combined with highly efficient washing operations you should be sure you have Pfizer GLUCONATES in your washing solution. If you are confronted with a bottle washing problem or any other problem which might be solved by a high-quality organic chemical, think of Pfizer first. Chas. Pfizer & Co., Inc., Chemical Sales Division, 630 Flushing Avenue, Brooklyn 6, N. Y.

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. . . sells more than 100 organic chemicals for food, medicinal and industrial uses.

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inert gases . . . problem gases

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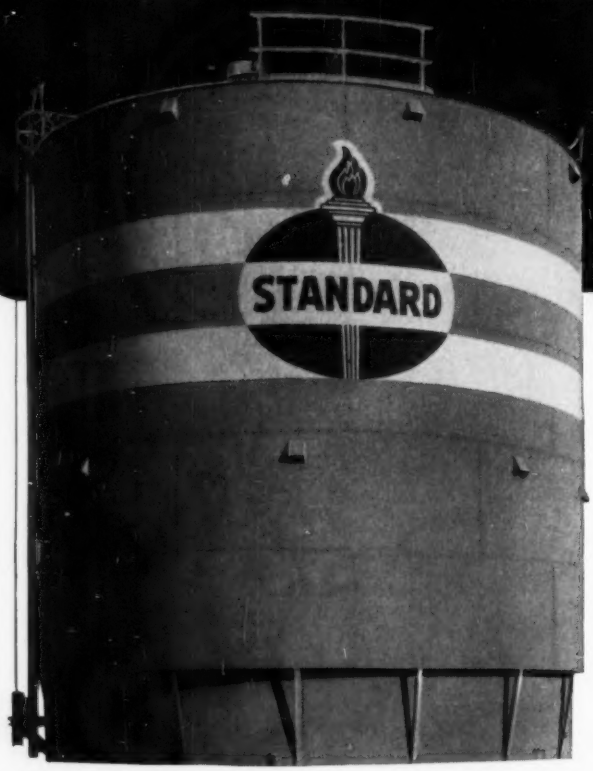

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SURFACE COATINGS – RCI offers vinyl acetate polymers and copolymers. For example, WALLPOL 9304 has fine particle size, is borax-stable. Offers high performance with maximum economy in interior and exterior paints. WALLPOL 9120 is highly distensible, has fine particle size, and is borax-stable. Offers premium performance coatings at reasonable cost. For floor paints, RCI recommends a combination of ACRIPOL 9425 acrylic emulsion and SYNTHEMUL 1505 alkyd emulsion. The latter is also highly suitable for the formulation of architectural gloss and semi-gloss enamels with the advantage of water clean-up. SYNTHEMUL 1506 is a vehicle for non-flammable industrial metal primers and finishes. RCI P-822 BECKOSOL is an emulsifiable alkyd for special coating applications. RCI P-719 BECKOSOL is an oleoresin additive for emulsion coatings incorporating protein binders.

FLOOR POLISHES – RCI acrylic ester copolymers, ACRIPOL 9425 and 9430, are emulsions designed for the formulation of floor polishes with excellent gloss and jetness on porous surfaces, freedom from dusting or yellowing. As companion materials for the ACRIPOL emulsions, RCI offers the floor polish manufacturer 1550 and 1551 WATEREZ, hard ammonia-soluble resins which give optimum hardness and abrasion resistance to ACRIPOL floor polishes.

TEXTILES – Two RCI vinyl acetate polymers are useful to the textile industry. PLYAMUL 9350 LV lends itself to the formulation of semi-permanent finishes (non-chlorine-retentive and non-yellowing) that impart crisp, firm hand to fabrics; while PLYAMUL 9370 finds application as a binder for non-woven fabrics. SYNTHEMULS 1530 and 1535 are emulsifiable alkyds with excellent adhesive and pigment binding properties, especially developed for the water-in-oil pigment printing of textiles.

PAPER COATINGS – RCI WALLPOL vinyl acetate polymers and copolymers have excellent properties for production of clear paper coatings where greaseproof and waterproof characteristics are desired. RCI ACRIPOL acrylic ester copolymers can be tailored to serve well as binders for pigmented and metallic finishes on paper. RCI SYNTHEMUL alkyd emulsions also find application in paper coating.

ADHESIVES – The RCI line of vinyl acetate polymers may be used alone or with plasticizers, starches, dextrines and fillers. PLYAMULS 9350 LV and HV, 9360 and 9370 are offered for professional compounding of adhesives with a wide range of end uses. PLYAMUL 9153 is a general purpose adhesive for many varied applications. In woodworking, it permits quick setting with minimum clamping requirements and gives exceptional bond strength. RCI P-721 BECKOSOL is a non-toxic polymeric plasticizer for vinyl adhesive emulsions.

CEMENT ADDITIVE – Cement manufacturers should investigate the unique properties of RCI PLYAMUL 9155. Added to cement, this modified PVAc emulsion improves bond to old masonry and to steel; permits feather-edging on concrete patches; improves toughness and resilience; minimizes need for damp curing and improves tensile and compressive strength.

Write Reichhold for full details on the RCI Resin Emulsions which may be suited to your production.

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RCI

Business
Newsletter

CHEMICAL WEEK
February 21, 1959

Upturned economic indicators seem to outnumber the downturned ones this week. But for chemical process companies, at least, the optimism isn't altogether overwhelming.

One industry authority—Du Pont economist Charles Reeder—thinks that '59 will be a boom year compared with '58 but that record output still may be accompanied by lower net earnings than in '58. In any event, he doesn't expect this year to equal '55 as a boom period.

Latest boom indicator: the McGraw-Hill forecast index of new orders for machinery, revealing that makers of equipment anticipate a 21% increase in dollar volume of new business this year. This forecast—based on a survey of "a representative group of machinery manufacturers accounting for more than 40% of all machinery sales"—turns up a hint that many CPI companies will be expanding and modernizing this year. It looks for a 49% increase in orders for engines and turbines, a 20% rise in bookings for new pumps and compressors.

•

One process industry with a less bullish outlook last week than a year ago: pharmaceuticals. Long-term, the drug companies' future glitters as brightly as ever. Manager George Stone of Pfizer's J. B. Rerig Division predicts a fourfold surge in ethical drug sales by '75, with a cancer cure expected by '65 and effective remedies by '62 for heart disease, mental disease, and the common cold.

But pharmaceutical stocks ran into a more bearish attitude than did most other industrial issues in the recent Wall Street slump. In the week ending Jan. 30, when the SEC's composite average was off 1.2%, there was a 1.6% drop in the average price for drug and medical stocks on the New York Stock Exchange. In the week ending Feb. 6, while the composite average slipped 2%, drugs and medicals dropped 4.7%.

And in Chicago last week, Parke, Davis & Co. President Harry Loynd scored "certain dubious practices" in the drug industry and warned that: "If we are to continue as private enterprises, we must critically examine certain of our practices and re-emphasize high ethical standards in all our activities."

•

Pharmaceutical companies' financial news is mixed. In five reports out last week, two companies told of record high sales and earnings for '58; the others listed setbacks in both columns.

Parke, Davis sales climbed 6%, to $172.6 million, and earnings inched up 0.4%, to $28 million. Pfizer achieved a 7% advance in sales, to $222.7 million, and a 4.5% rise in earnings, to nearly $24 million.

Abbott Laboratories chalked up a 4.8% increase in sales, to $116.6 million; and net income was up 1%, to $12.87 million.

Schering reports sales off 7.4%, to $78.2 million, and earnings down not quite 19%, to $12.45 million. Eli Lilly's sales dwindled by about 10%, to $180.5 million; net income dropped 26.6%, to $23.7 million.

American Cyanamid—whose Lederle pharmaceutical division has been one of its best money-making units—had only a 1.4% dip in sales, to $525.1 million; but net income declined 14.6%, to $43.8 million.

•

Newest water-pollution incident is still an open case.

Some 200,000 fish have died since the beginning of '59 in a stretch of the Shenandoah River downstream from Front Royal, Va.; but the Virginia Water Control Board has been unable to fix the blame—either on American Viscose's Front Royal plant or any other plant there.

Viscose uses batches of zinc oxide to process rayon products, and zinc compounds are in its effluent. During recent months the plant has boosted production—and the added zinc waste could, conceivably, be one factor in the fish-kill.

However, the effect of zinc on fish is variable. Exact toxicity levels aren't known. The water control board officials expressed doubt that any "positive" proof would be found that the Viscose plant was at fault.

•

At Du Pont's board meeting this week, directors voted a first-quarter dividend of $1.50—the usual rate over the past four years—but did not decide on a stock split. Anticipation of possible stock-split action had buoyed the price of Du Pont stock eight points the previous trading day; the price then dropped six points after the meeting but recovered more than half that loss in a few hours.

•

Dow Chemical's business is good—especially in magnesium and plastics. Vice-President and Treasurer Carl Gerstacker says the way things are going now, Dow's fiscal '59 sales will total about $700 million—up 10% from the year ending last May 31. Net income may hit $2.11/share, compared with last year's $1.78.

•

In labor this week, the big glass strike has ended, and Pittsburgh Plate Glass has reopened seven big plants shut down since last Oct. 6. Negotiators compromised on incentive pay procedures and work reclassification. Two small strike settlements provided modest pay hikes: 6¢/hour for R. P. Scherer Corp. employees at Detroit; 5-9¢ (6.8¢ average) for American Cyanamid employees at Mobile, Ala.

Florida phosphate workers have decided to ask 11 employers for company-paid supplements for occupational disability, company-and-union designated physicians to examine workers for silicosis.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

Feb. 21 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1959

Polyethylene Properties Of Great Value to Labs Handling Radioisotopes

Polyethylene's properties of radiation-resistance, chemical inertness and physical toughness are proving invaluable to a fast-growing group of chemists and engineers who work with radioactive isotopes in the laboratory.

Contamination—its prevention and elimination—is of course the greatest concern of those who work with radioactive materials. Polyethylene reduces the problem in a number of ways. It is nonionic—will not pick up or transmit stray ions readily. It is nonporous and chemically inert—so can be cleaned easily. Polyethylene containers, equipment and furnishings are generally one-piece moldings—eliminating cracks and joints which might trap radioactive particles.

A highly radiation-resistant material, polyethylene can take doses up to six megaroentgens without degradation. In fact, low doses of radiation have been used to improve the heat resistance of this plastic. Polyethylene has even been employed as a secondary shielding for neutrons which penetrate lead.

Polyethylene makers are looking forward to a fast-growing market for their products in the lab—and perhaps even in the plant—as radioactive materials become increasingly available for industrial use.

New Safety Data Sheet Out on Phosphoric Acid

Properties and safe-handling practices for phosphoric acid have been compiled in a new safety reference booklet now available from MCA at nominal cost. The 14-page booklet covers hazards and their control, employee safety, fire fighting, handling and storage, equipment cleaning and repairing, waste disposal, health measures and first aid.

As a producer of wet process phosphoric acid, U.S.I. can supply further data on individual safety requirements for specific uses.

Zirconium Valve Stems Prove Ideal for Acid Service at Mallory-Sharon

After 14 months in acid service, 40 zirconium-stemmed control valves are still operating without a single stem failure at the Mallory-Sharon zirconium plant, Ashtabula, Ohio.

The valves are used in all concentrations of hydrochloric and sulfuric acids, raffinate, acidified hexone, solutions of ammonium thiocyanate and thiocyanic acid, and other solutions. Mallory-Sharon engineers say they have proved excellent in every way—requiring very little maintenance or operator attention.

Designed by an instrument engineer at U.S.I. (one-third owner of Mallory-Sharon Metals), the valves were custom-fabricated

MORE

Finely-Divided Sodium Lowers Costs, Improves Yields in Broad Range of Chemical Reactions

Many New Products, New Processes Made Possible Through Development of Finely-Divided Sodium Techniques.

Sodium in the form of dispersions is offering important advantages in many chemical processes today. It provides a reliable mechanism for controlling reaction speed. It makes possible the addition of immediately available sodium at a desired rate, thereby giving better control of reaction conditions. Many chemicals can now be produced in larger yields, in shorter time and at lower cost than has been possible with other materials or other methods.

Dispersions for Claisen Condensation

In Claisen condensation reactions, sodium dispersions give high yields and fast reaction rates in the production of such compounds as ethylacetoacetate, ethylbenzoylacetate and ethylsodiumoxalacetate. In the condensation of ethylacetate to ethylacetoacetate, for example, a combination of highly dispersed sodium and increased temperature gives practically quantitative yields of acetoacetic ester, based on sodium. The use of this technique eliminates the time-consuming preparation of sodium ethylate.

Organosodium Compounds

Finely-divided sodium now offers a simple, economical route to many old and new compounds of the organosodium type (containing direct carbon-to-sodium bond). These compounds are obtained by halogen replacement, hydrogen substitution or addition.

MORE

Using halogen replacement,

Commercial reactions using sodium dispersions are run in conventional equipment like this jacketed kettle.

Use of Chemical Milling Grows in Metalworking

Many metalworkers are now using chemicals to etch out complex metal shapes to very close tolerances. Large amounts of metal over wide areas, to a depth of about one inch maximum, can be removed economically by this technique on jobs where conventional machining operations would be difficult and costly, or sometimes impossible.

First the entire metal part is coated with a masking compound and allowed to dry. Using a sharp-bladed knife to cut through the cured mask, and a suitable template to guide the knife, the design is transferred to the part. The mask is then peeled from those areas to be chemically milled, and the part is dipped in or sprayed with a chemical solution to etch away the unmasked areas. Caustic soda is one of the major constituents in the etchant to mill aluminum. Magnesium, titanium and stainless steel are chemically milled in acid mixtures which typically are blends of sulfuric, nitric, hydrochloric and hydrofluoric acids.

Chemical milling has been applied successfully on a mass production basis to aluminum, magnesium, titanium, mag-thorium, Inconels, Monels, carbon steels and steel superalloys. It is used widely in the aircraft and missile fields where great weight savings can be achieved over machine milling. Both castings and forgings have been shaped by chemical means. Electronic circuits, steel shipping containers, pump impellers, radar aerials and decorative paneling are among the products outside the aviation field to which chemical milling has been applied.

Sodium Coolant from Reactors Studied for Use In Radiation Processing

The Atomic Energy Commission has contracted for a feasibility study on using the sodium reactor coolant at the Hallam Nuclear Power Facility as a high-level radiation source for industrial processing. The study will investigate the technical feasibility of using the radioactive sodium coolant for industrial radiation processing and of integrating such a radiation processing plant with the nuclear power facility being built at Hallam, Nebraska. Included will be a preliminary design study for the radiation processing plant.

Feb. 21 ★ **U.S.I. CHEMICAL NEWS** ★ 1959

CONTINUED *Sodium*

the U.S.I. laboratories have developed a new route to Grignard reagents as follows:

(a) $RCl + 2Na \longrightarrow RNa + NaCl$

(b) $RNa + MgCl_2 \longrightarrow RMgCl + NaCl$

Sodium is a less expensive starting material than magnesium, and less hazardous hydrocarbons can be substituted for ether as a solvent. In addition, higher yields are obtained with the sodium process.

Another halogen replacement reaction employs chlorobenzene in a sodium dispersion to yield phenylsodium, which can be reacted with toluene in a hydrogen substitution reaction to give benzylsodium. Phenylsodium, benzylsodium and many other organosodium compounds can be reacted with metallic halides such as $AlCl_3$, BCl_3, etc. to yield corresponding organometallic compounds.

Further details on the syntheses possible with organosodium compounds are given in U.S.I.'s free booklet "Sodium Dispersions".

Other Uses for Sodium Dispersions

A suspension of sodium hydride in mineral oil is easily produced by treating a sodium dispersion with hydrogen gas at 250-325°C and 200-500 psi hydrogen pressure.

Sodium dispersions are used to reduce nitriles to amines, ketones to alcohols, metal halides to finely-divided metals, esters to acyloins. They are employed to prepare sodamide and sodium acetylide. These reactions represent only a portion of the possible applications for sodium in finely-divided form.

Sodium Removes Impurities

Finely-divided forms of sodium are also being used to remove impurities from petroleum fractions and other hydrocarbons that do not possess conjugated double bonds. For example, coke oven producers of benzene, toluene and xylene are finding it difficult to compete with corresponding petroleum-based materials in so far as purity is concerned. Particularly, thiophene content is too high. However, by means of a novel U.S.I. process, coke oven aromatics can now be desulfurized with finely-divided sodium.

CONTINUED *Zirconium*

using zirconium sponge from U.S.I.'s own pilot plant—forerunner of the present Mallory-Sharon installation.

In this instance, of course, initial zirconium cost was not a factor. However, the extremely long service life of the material, and the freedom from maintenance problems, bear out Mallory-Sharon's contention that zirconium is very economical over the long pull in applications where lower-priced metals just do not stand up.

In the recent past, zirconium has been a costly material and its availability for industrial applications has been limited. Now, with a million pounds per year of the metal available to industry from the Mallory-Sharon plant alone, costs are continually being reduced. It is possible to foresee fabrication of zirconium parts at costs only 3 to 5 times higher than for equivalent parts in stainless steel. In most cases, improved performance with zirconium will much more than offset the cost differential.

After 14 months in acid service, zirconium-stemmed control valve still operates at Mallory-Sharon zirconium plant, Ashtabula, Ohio.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New bottle carrier of heavy-wall polyethylene, designed for safe intra-plant transport of one-gallon bottles of corrosive chemicals and solvents, is now on market. Carrier said to prevent breakage, also to contain bottle contents. **No. 1440**

Eight longer-lived radioactive isotope standards, supplied until now by the National Bureau of Standards only, are available commercially. They are cesium-137, cobalt-60, iron-59, radium D+E, strontium-90, sulfur-35, tantalum-182 and thallium-204. **No. 1441**

New ultracentrifuge auxiliary permits separation, identification and characterization of materials up to 120° or down to 0°C. Broadens ultracentrifuge use in fields where solutes are not soluble enough at normal temperatures. **No. 1442**

Diphenyldidodecylsilane can now be obtained in limited commercial quantities as a new hydraulic fluid for systems subject to temperature and environmental extremes. Claimed to have good lubricating properties. **No. 1443**

Series of data sheets on tank truck shipment of liquid chemicals is now being sold. 35 sheets now available, each on a different chemical, give data on suggested equipment, loading, handling, safety, clean-up, etc. **No. 1444**

Over 200 organo-metallic compounds are cataloged in new brochure now available. Listed by main constituent such as boron, tin. Physical constants given for research chemicals, specs and uses given for commercial chemicals. **No. 1445**

170 Standards for fire safety are compiled in new, 6-volume, 1958 edition of National Fire Codes, now being sold. Includes 38 new or revised standards. Volumes on fluids, solids, buildings, extinguishers, electrical, transport. **No. 1446**

Non-flammable phosphoric acid type cleaner for most metals has been developed. Said to remove rust, metal oxides, oil and grease rapidly in one simple operation. Leaves light phosphate film on steel and zinc. Can be used hot or cold. **No. 1447**

New boron analyzer, designed to measure boron content of liquid process streams continuously to $\pm 1\%$ by volume, is now on market. Detects B^{10} isotope of boron, works on neutron absorption principle. **No. 1448**

Tracer applications for study of organic reactions are discussed in new book now being sold. Intended to stimulate use of isotopes among organic chemists. Appendices list texts on isotope use, organic reaction mechanisms. **No. 1449**

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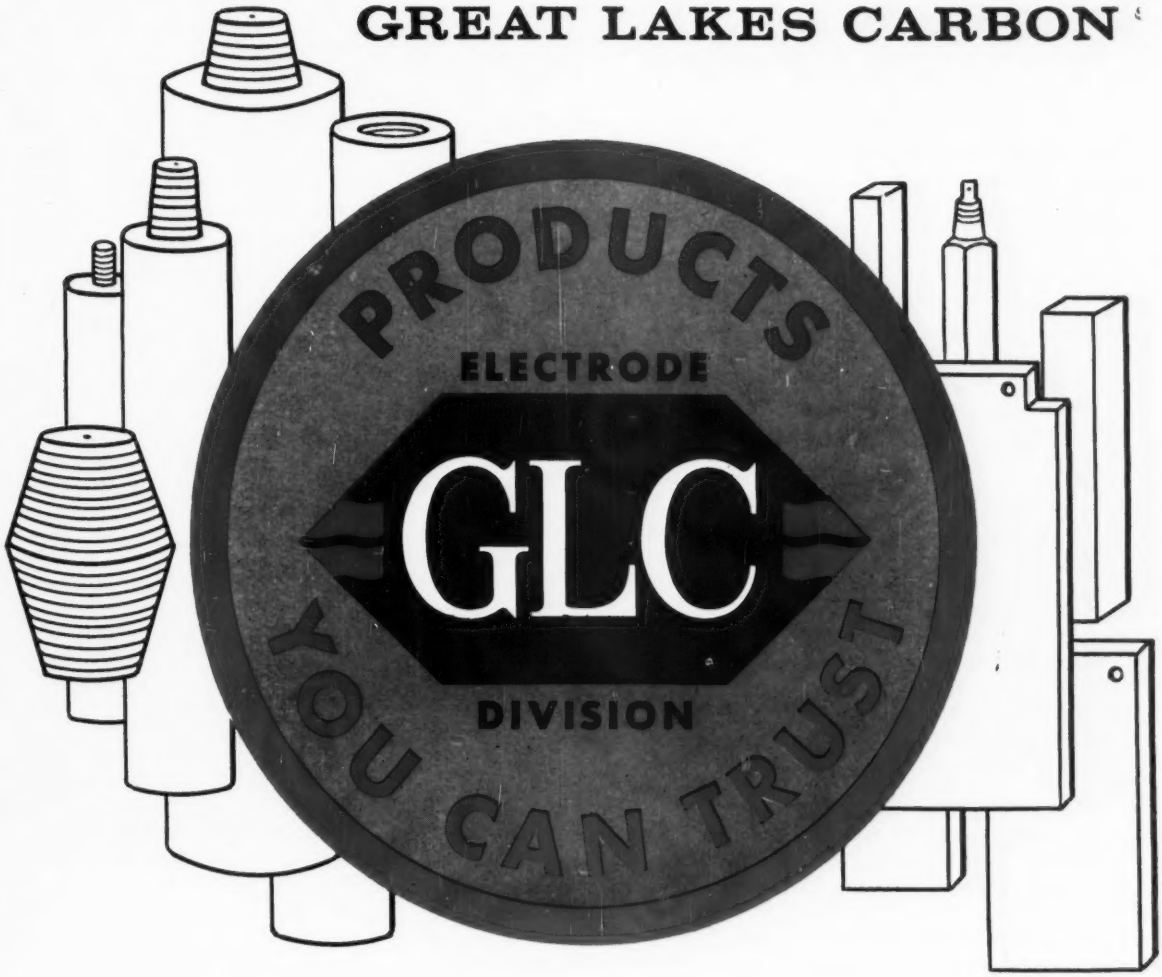

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VIEWPOINT

THE GUIDING LIGHTS of the AFL-CIO are meeting in San Juan, Puerto Rico, this week and next for their annual convention. One of their major concerns is the slowness with which manufacturing employment is increasing from its recession low point.

Before we are deafened by demands for four- or three-day work weeks, penalties for overtime by current employees, and Congressional investigations of the employment situation, let us point out one fact: labor leaders have brought much of this on themselves. They've encouraged wage inflation—across-the-board raises greater than can be justified by increased productivity by workers.

There are only three ways to pay for wage inflation: (1) charge higher prices; (2) lower your profit margins and (3) increase the amount of mechanization you use in your plant. It is significant that the large and inflationary wage settlements of 1955-56 were followed by substantial capital expenditures—not only for new plant, but for modernization of current facilities. And mechanization has been most prevalent in industries with skyrocketing labor costs.

The recovery of the chemical industry's profit margin in the final quarter of '58 will undoubtedly be used as a union argument in forthcoming chemical wage negotiations. But wages are just one factor to be considered. Obviously an increase in profits allows management a greater flexibility of operation as far as wages, working capital, and capital spending are concerned. But the wage increases should be those merited by current increases in worker efficiency—and those that can be expected during the term of the contract.

If industry can hold the wage line through the coming difficult period of bargaining and strike threats, the prospects of avoiding inflation in '59 will be far better than in previous years of general prosperity.

H. E. Johnson

Editor-in-Chief

OPINION

To Solve the Crisis

TO THE EDITOR: I read with great interest Lauren B. Hitchcock's excellent report on "The Coming Crisis in Technology" *(CW, Dec. 13, '58, p. 93)*. While, undoubtedly, outside consultants will become of greater importance in the future, the crisis could be avoided, in my opinion, in other more fundamental ways, too, by:

(1) Permitting research and development personnel to work to age 75 either full time or as part-time consultants or in associate positions.

(2) Making concentrated efforts in this country to bring in more scientists from abroad, even to the luring of scientists from behind the Iron Curtain if necessary.

(3) Discouraging further any discrimination based on sex, color, religion or nationality. Unfortunately, such discrimination is still practiced in much of industry and in many parts of the country.

(4) Placing critical research and development projects on a 10-hours-a-day, 6-days-a-week basis, with commensurate overtime compensation. Scientific leadership demands sacrifice. U.S. scientists and companies owe this sacrifice to their country. And, without this sacrifice, leadership in certain critical areas of R&D will be lost. In some basic research areas, in fact, we are already becoming experts in the art of copying, not because of the shortage of talent but because of insufficient hard work and incomplete, often wasteful, utilization of existing talents.

(5) Preventing too-frequent drifting of scientists from one company to another through a renaissance of *esprit de corps*.

(6) Making research and development jobs more attractive by:

(a) Giving leading scientists the same remuneration and recognition we give sales executives.

(b) Reducing the paper work and administrative burden of scientific personnel to the barest minimum.

(c) Affording scientists greater opportunity of traveling, studying and visiting other research centers and institutions in the U. S. and abroad.

(d) Electing more scientists to the boards and executive committees of chemical companies. This would take the ceiling off the opportunities available to qualified scientific leaders and permit them to participate in directing the destinies of companies they helped to build.

(e) Creating a more realistic image of the scientist. Too much recognition goes to leaders in . . . sports, politics, entertainment, even crime. The scientist is usually relegated to a back-seat position.

We need spiritual, productive and scientific fortitude to overtake the growing Communist threat. Let's not forget that the past few years have shown us that the Communists are progressing in every field of endeavor under the watchful eyes of their government, which continually reminds them that "He who does not work, neither shall he eat" (Article 12 of the Constitution of the U.S.S.R.).

MAURYCY BLOCK
750 Third Ave.
New York

Freedom of Expression

TO THE EDITOR: . . . I must confess that after reading the write-up of my talk in your publication *(CW, Jan. 24, p. 67)*, I felt a bit envious of the ability of your writer in his choice of words. In a number of instances, my thoughts were expressed in words that were far better than those I used.

C. E. PAULES
Vice-President
Esso Research & Engineering Co.
Linden, N.J.

MEETINGS

Technical Assn. of the Pulp and Paper Industry, 44th annual meeting, Commodore Hotel, New York, Feb. 23-26.

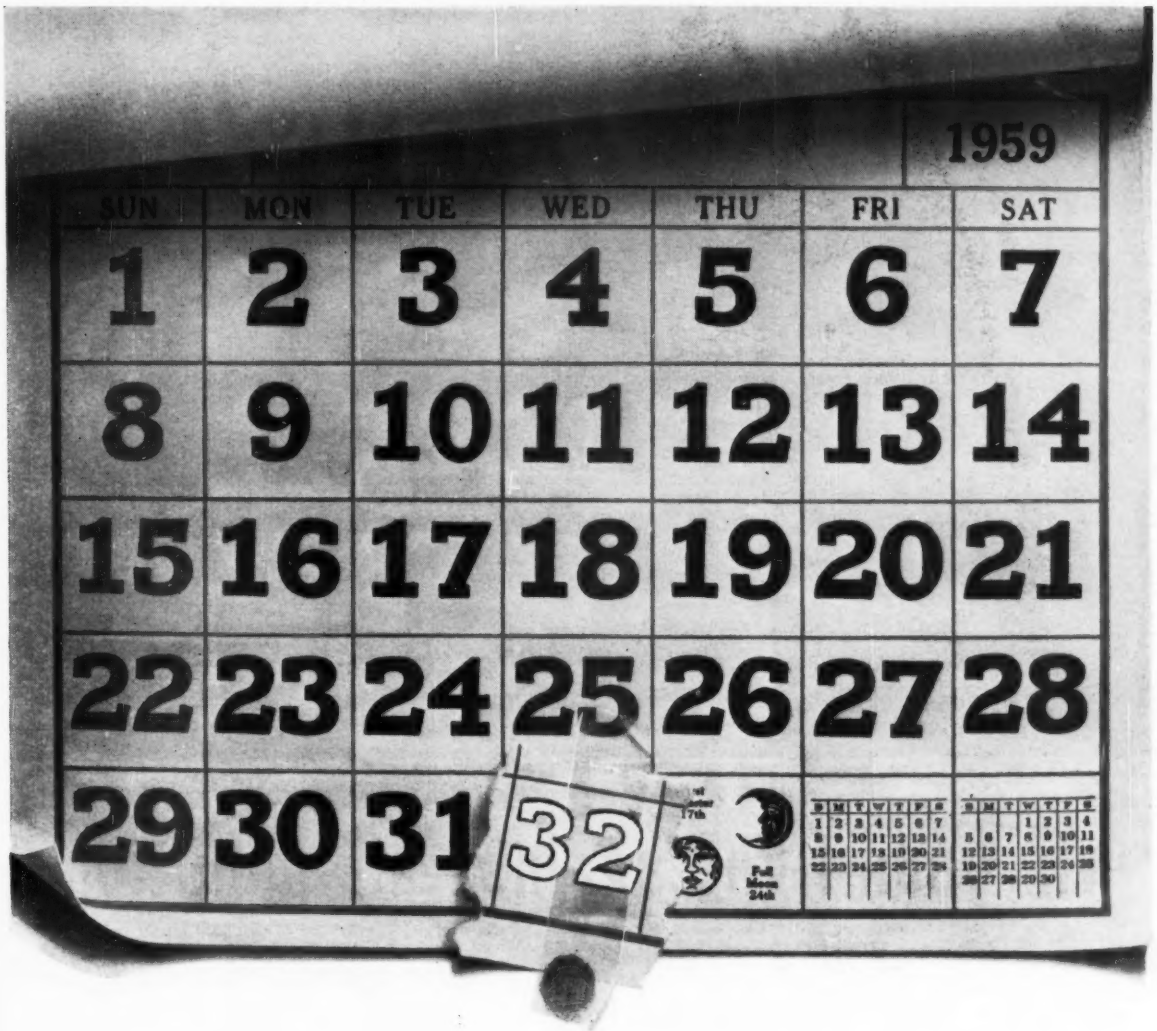
American Pulp and Paper Assn., 82nd annual paper week. Waldorf-Astoria Hotel, New York, Feb. 26.

Commercial Chemical Development Assn., annual New York meeting; theme: diversification in the chemical industry; Statler Hotel, New York, March 4-5.

International Acetylene Assn., annual convention, Roosevelt Hotel, New Orleans, March 9-10.

Assn. of Consulting Chemists and Chemical Engineers, panel of six experts in open discussion; subject: Selling Professional Services; Shelburne Hotel, New York, March 10.

Fifth Nuclear Congress, Public Auditorium, Cleveland, April 5-10.



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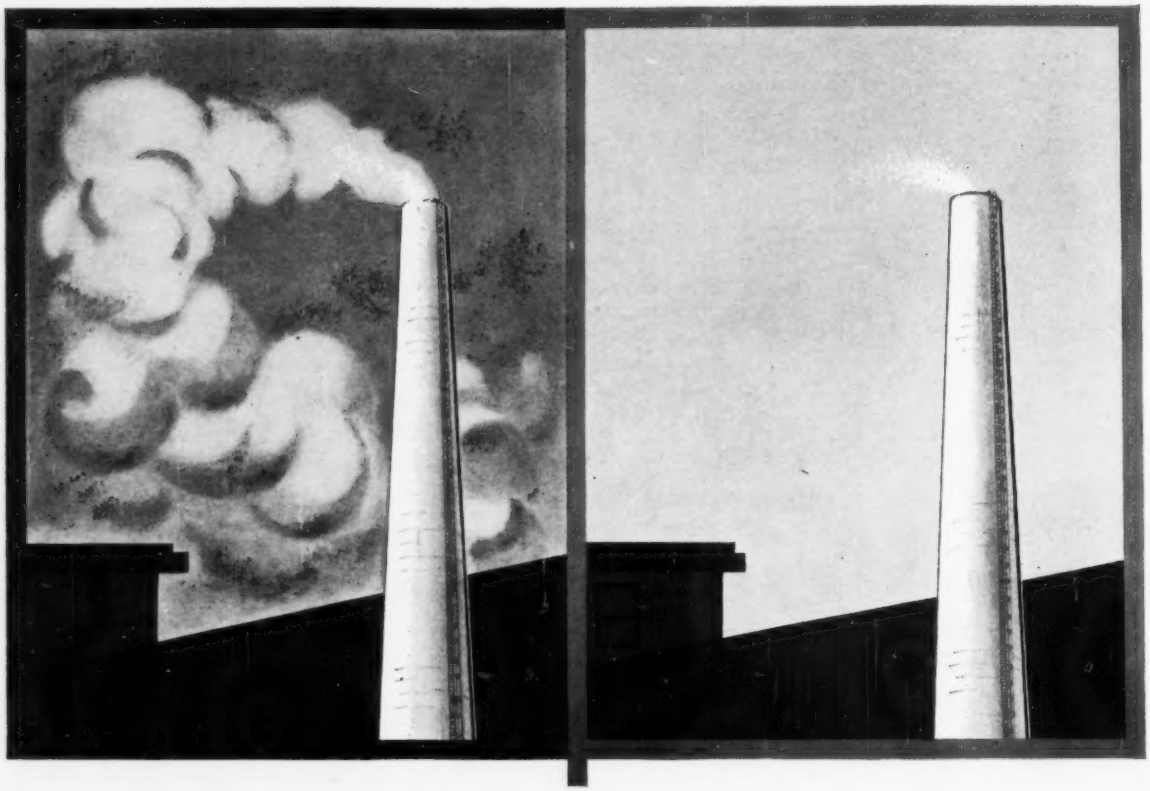

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Today Dracco systems satisfy the toughest anti-pollution laws in many of the nation's largest metropolitan areas. In anticipation of even more stringent ordinances, Dracco research is developing advanced filtering media and radically new agglomeration and collection techniques.

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Lubrication News

PROFITABLE IDEAS ON THE LUBRICATION OF CHEMICAL PROCESS EQUIPMENT

TEXACO

PLANT REDUCES LUBRICANTS FROM 27 TO 7—PROCESSING IS IMPROVED

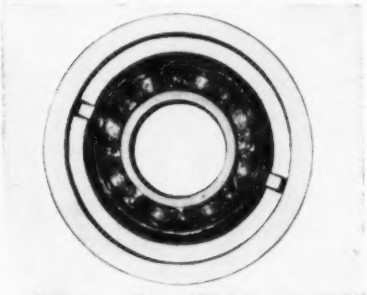
Multi-purpose greases cut lubrication costs

One plant in the basic chemicals industry has eliminated 20 lubricant specifications from its inventory. The maintenance supervisor reports that the plant is operating more efficiently than it ever did before.

This is just one example of a cost-cutting trend to fewer lubricants in chemical plants. Multi-purpose greases are replacing numerous specialty lubricants—even in areas of high heat, exposure to water or moisture, and oxidation or corrosion.

How multi-purpose greases cut costs

The most important cost-saving advantage of using multi-purpose greases is this: the man who lubricates equipment always uses the right grease. He doesn't have to choose the lubricant from among several drums. As a result, there's less chance of putting the wrong lubricant into a valuable piece of process equipment.



Bearing stopped in motion by high speed photography. Note how grease completely floods retainer and moving parts.

In addition, less lubricating equipment is required to apply multi-purpose greases. Perhaps only one grease gun will be needed for one entire part of a plant. And—there can be no confusion about which applicator goes with each lubricant. As a result, lubrication rounds take less time—labor costs go down.

Use of a multi-purpose grease also saves time in training lubrication crews, by making it easy to select the proper lubricant. It's easier, too, to set up a centralized, automatic lubricating system when only one lubricant is used.

Grease fully protects bearings

Multi-purpose greases are now available that completely lubricate all types of bearings and sliding surfaces. They also seal against dust, water contamination, or corrosive products and atmospheres.

These multi-purpose greases contain inherent properties that make them satisfactory for all except extreme or unusual operating conditions. They have good resistance to water washing. They will absorb limited amounts of water without change in consistency. They provide good resistance to oxidation. Maximum continuous usable temperature can be as high as 300° F. Stability on working is in many cases excellent.

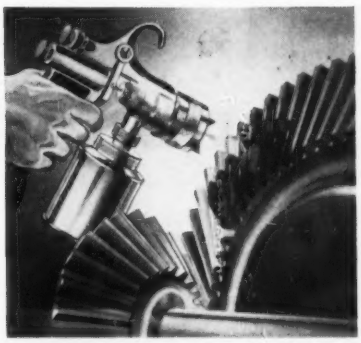
New movie shows how grease tests predict performance in plant

How well will a grease stand up under pressure? How long will it resist washing by water? How much can it take before it shears or leaks? What happens under conditions of extreme cold? Heat?

A new movie, "Shear Magic," reveals how laboratory tests anticipate what happens when a grease is exposed to these conditions in the plant. Described are the "4-ball load test," which measures how well a grease stands up under pressure; water washing and rusting tests; leakage tests; and tests for resistance to heat, cold and wear.

The movie also shows how greases of all kinds are made, and explains the mechanics of grease lubrication.

A showing of the 25-minute sound and color movie can be arranged at your plant. Attach coupon at right to your letterhead.



Spray system protects open gears against abrasion by dust, dirt

Open gears have long been lubricated by applying heated grease with a hand paddle. This has to be done when the gears are not running. Now, a spray application method makes it possible to lubricate open gears without machine downtime—and without sacrificing the complete protection required, especially in areas of excessive dust and dirt.

Another advantage of spray application is that it keeps the gears cleaner, less likely to foul up with contaminants.

The method described permits use of either manual or automatic spray applicators.

Management Practices Book

This guide to organized lubrication can help you achieve important savings in maintenance costs. It discusses methods that help raise production, extend parts life, cut downtime. For free copy, use coupon below.

THE TEXAS COMPANY
Dept. CW-CP-10
135 East 42nd Street
New York 17, N. Y.

I am attaching my company letterhead to this coupon.

- ☐ Send a copy of Management Practices that Control Costs via Organized Lubrication.
- ☐ Send more information on the movie, "Shear Magic."
- ☐ Ask a Texaco Lubrication Engineer to call at my plant.
- ☐ Can you help solve the attached lubrication problem?

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THE QUALITY OF TEXTILE COLORS in woolens or combined natural and synthetic fabrics often depends on the thoroughness of the fulling and scouring operation. Ultra's Ultrapole® S is particularly outstanding as the active ingredient in these agents by helping textile processors to cut costs in intermediate operations.

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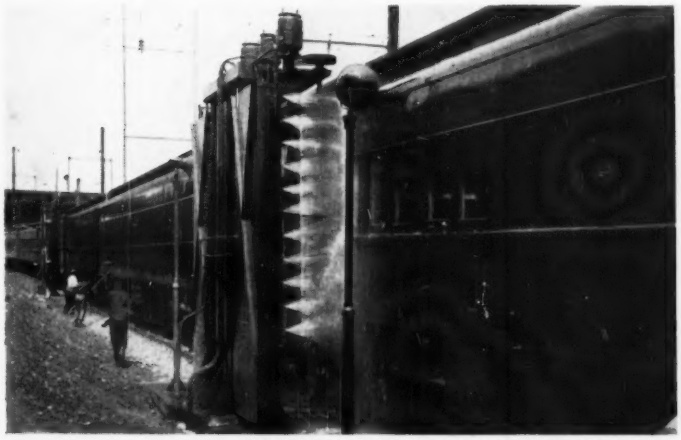

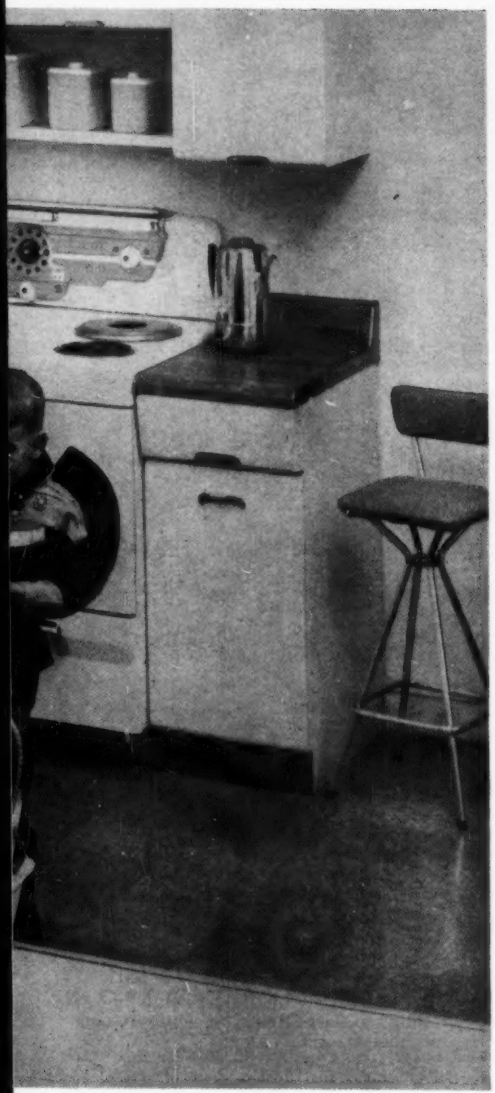

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- Synthetic Detergents
- Detergent Additives
- Spray-Dried Chemicals
- Organic Chemicals
- Channel and Furnace Blacks
- Emulsifiers and Surface Active Agents for agriculture, foods, cosmetics, and other industries
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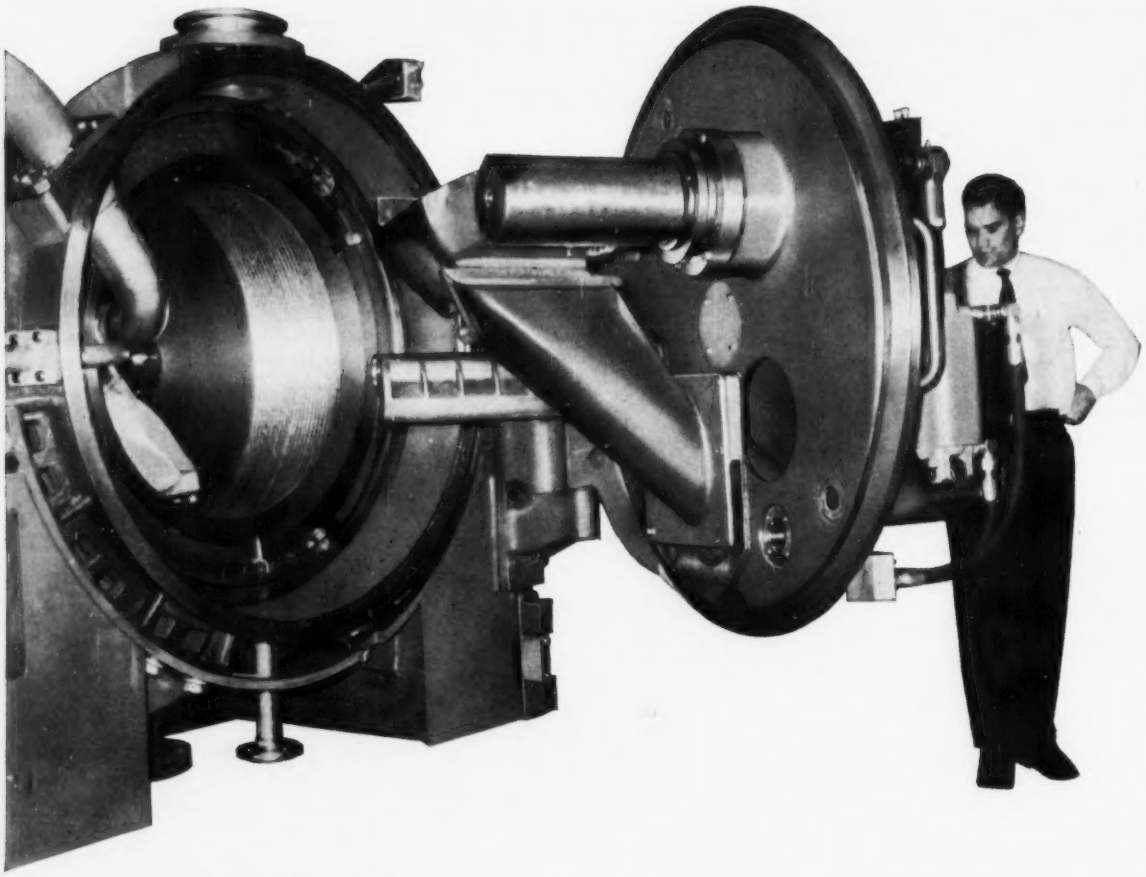

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20-24 tons/hour

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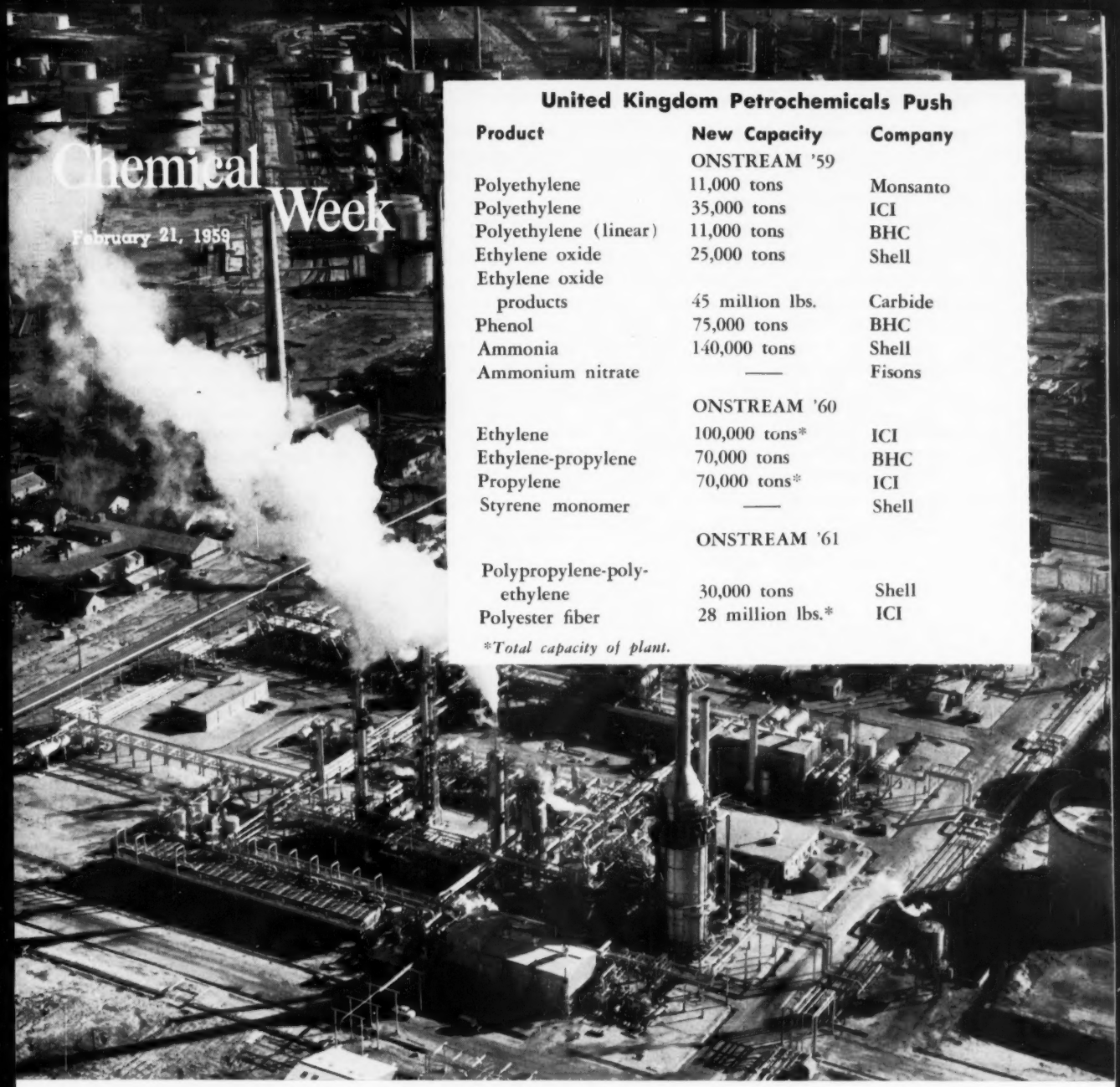
Chemical Week
February 21, 1959



United Kingdom Petrochemicals Push

Product	New Capacity	Company
	ONSTREAM '59	
Polyethylene	11,000 tons	Monsanto
Polyethylene	35,000 tons	ICI
Polyethylene (linear)	11,000 tons	BHC
Ethylene oxide	25,000 tons	Shell
Ethylene oxide products	45 million lbs.	Carbide
Phenol	75,000 tons	BHC
Ammonia	140,000 tons	Shell
Ammonium nitrate	——	Fisons
	ONSTREAM '60	
Ethylene	100,000 tons*	ICI
Ethylene-propylene	70,000 tons	BHC
Propylene	70,000 tons*	ICI
Styrene monomer	——	Shell
	ONSTREAM '61	
Polypropylene-polyethylene	30,000 tons	Shell
Polyester fiber	28 million lbs.*	ICI

**Total capacity of plant.*

Esso's Fawley complex, ringed by other U. S.-backed plants, is a major producer of U.K. petrochemicals.

British Boom Menaces U.S. Trade

With a full-fledged petrochemical boom on in Europe, U.S. producers face contests for once-secure export markets. Latest bellwether of stiffer competition: Shell Chemical Co. Ltd.'s decision to build the United Kingdom's first polypropylene plant.

The new plant will also produce polyethylene in a wide range of densities, although bulk of output will be high-density material. Plant capacity: 30,000 tons/year.

First construction stage, slated for completion in 1961, is designed to permit expansion to a capacity of 45-50,000 tons.

For Shell, as well as the U.K., these plans herald the first commercial production of polypropylene. Shell has been pilot-planting polypropylene in the Netherlands, test-marketing the plastic in England. Its polypropylene process, says the company, is its own, although based on Ziegler-Natta techniques. Polyethylene will be made by the Ziegler low-pressure process, for which Shell is exclusive licensee in the U.K.

Fast Rise: Shell's latest venture dramatizes the spurting progress of England's petrochemical production.

In terms of carbon content, petrochemical output in the U.K. rose 240%—to some 327,000 metric tons—between '53-'58.

Growth in the "Common Market"

countries has been even more rapid—up 600% in the same period—and total Euromart output now exceeds England's. On a national basis, however, England is still top producer, accounts for about 40% of total European output. Its closest competitor, Germany, produced only 166,000 metric tons of petrochemicals in '57, compared with the U.K.'s 274,000 tons.

Prime force behind England's petrochemical boom has been the demand for plastics. Output in '58 was more than 400,000 tons, triple that of '48. Exports took 100,000 tons.

The rate of increase of total petrochemical output has been greater than that of plastics production because the former climbed from nearly zero since World War II, while plastics output has built on a base of coal-derived materials.

Polyvinyl chloride, for example, is still coal-derived, represents a sizable chunk of U.K. plastic sales—67,500 metric tons in '57, out of total plastics sales of 396,500 metric tons. Phenolics also fall outside the petrochemical province, since they rely heavily on coal-derived benzene. Sales of phenolic and cresylic plastics were 56,100 metric tons in '57.

In the Lead: But polyethylene expansions (*see table, p. 29*) are leading the plastics raw-material shift toward petrochemicals. Large-scale production of polyethylene began in '51, this year should hit 125,000 tons.

The trend toward petrochemical-based plastics is part of the British chemical industry's general shift away from coal. Petrochemicals now account for 42% of total U.K. organic chemical output. To feed this growth, the major oil companies have expanded refinery capacity from the pre-World War II level of 50,000 bbls./day to today's 730,000 bbls./day. (England produces no natural gas.)

Big Switch: The major shift away from coal has been in alcohol production. Before the war it was made from coal and from imported molasses. Ammonia and methanol producers have also turned to petroleum. And the U.K.'s first petroleum-based phenol will soon be flowing from the British Hydrocarbon Chemicals plant now abuilding.

But coal is still cheaper in the U.K. than oil, which must be imported. Acetylene, benzene, phenol — which are made largely from petroleum in the U.S.—still are coal-based in the U.K.

The big petrochemical complex abuilding at Fawley (near Southampton) is typical of the shift in the British chemical industry, and of the part U.S. companies are playing in it.

Heart of the Fawley complex is Esso's refinery—biggest in the U.K.—and the $28-million petrochemical plant Esso brought onstream last November. It will turn out 42,000 tons/year of butadiene, 40,000 tons of ethylene and other basic chemicals.

The butadiene feeds the new 70,000-tons/year styrene-butadiene rubber plant (first in the U.K.) built by International Synthetic Rubber Co. This is a joint venture of Dunlop, Goodyear, Firestone, and Michelin.

Esso's ethylene has started flowing to Monsanto Ltd.'s $20-million, 11,000-tons/year polyethylene plant — now starting up—and by the end of this year it will also supply Union Carbide Ltd.'s new 45-million-lbs./year ethylene oxide derivatives plant. (Monsanto Ltd. is two-thirds owned by the U.S. parent company; Carbide Ltd. is a wholly owned subsidiary.)

Pace Setter: While British Celanese put up Britain's first olefin plant in 1942, the real foundations for a U.K. petrochemicals industry were laid by Imperial Chemical Industries Ltd. As far back as '29, ICI was using aliphatic organic chemicals as solvents in the manufacture of paints, explosives, leathercloth. In '39, ICI started making polyethylene, using ethanol for its ethylene source.

Then, in '51, it put up its first full-scale olefin plant, to supply the raw materials for polyethylene, glycol, detergents, methacrylate. The second went onstream in '56; the third, due onstream next year, will bring ICI's total capacity to some 100,000 tons/year of ethylene, about 70,000 tons of propylene.

ICI's main petrochemical center is its 2,000-acre Wilton plant (*CW, Jan. 24, p. 23*). Current output there includes: polyester fiber, 10,000 tons/year; butadiene copolymers, 10,000 tons/year; methacrylate, 5,000 tons/year; and polyethylene, some 55,000 tons/year. Wilton's 10,000 tons/year nylon output, like all U.K. nylon production, is based on coal-derived benzene.

Olefins piped from Wilton to ICI's Billingham works (biggest chemical complex in the British Commonwealth) go into isopropanol and acetone, butanol, other intermediates.

Coming up at Wilton: a fourth polyethylene plant, to boost capacity to 90,000 tons; and Terylene polyester capacity will be increased to 30 million lbs. in '59, 50 million by '61.

But these expansions will be dwarfed by ICI's $280-million building program scheduled to begin this year at its new Severnside site.

Second Runner: Rivaling ICI for first place in petrochemical output is Shell Chemical Co., Ltd., the U.K.'s second-largest chemical producer. Shell will not reveal sales (estimate: $90 million), but Managing Director L. H. Williams has forecast they will approach $300 million in 10 years. Shell is the U.K.'s major supplier of detergent base stocks, accounts directly for two-thirds of synthetic detergents used by industry for processing, and half the raw materials used by other syndet producers.

Shell Oil put its first petrochemical venture—a detergent plant—onstream in 1942, but waited several years before plunging deeply into petrochemicals. The subsidiary now has three petrochemical production centers.

Carrington produces ethylene, propylene, and a full range of derivatives, including ethylene oxide, glycols, isopropanol, polystyrene, and the only petroleum-based benzene made in the U.K.

At its Stanlow refinery, Shell turns out a variety of alcohol and ketone solvents from propylene and butylene, ethylene (for use by Associated Ethyl for antiknock compound), and Epikote resin.

Petrochemical output at Shell Haven, the third site, is more modest than at the two others. Shell has a refinery there, produces lube oil additives and detergent alkylates (capacity recently enlarged to 30,000 tons/year). Starting up: a 75,000 tons/year ammonia plant. Some of the output will be used captively for fertilizer, most (60,000 tons/year) will go to Fisons' new $12.5-million ammonium nitrate plant at Stamford-Le-Hope.

Other major Shell developments are slated for Carrington. A 25,000-tons/year ethylene oxide plant is about to come onstream, bringing total ethylene oxide capacity there to 45,000

tons/year—about a third of Europe's requirements. A styrene monomer plant is due onstream in '60.

In preparation for the new polyolefin plant, Shell has operated a 1,000-tons/year pilot plant for the past year.

In Third Place: Holding the No. 3 spot in Britain's petrochemical industry is British Hydrocarbon Chemicals Ltd., set up in '47 as a 50-50 venture of British Petroleum and The Distillers Co.

BHC's first cracking unit came onstream in '51, has grown to a capacity of 60,000 tons/year. Products — all intermediates—include ethylene, propylene, butadiene, ethanol, isopropanol, tetrapropylene, and phenol.

This year BHC plans to start up an 11,000-tons/year Phillips-process linear polyethylene plant, and a phenol plant. A 70,000-tons/year olefin plant is due in mid-'60, bringing BHC's total plant investment to some $85 million.

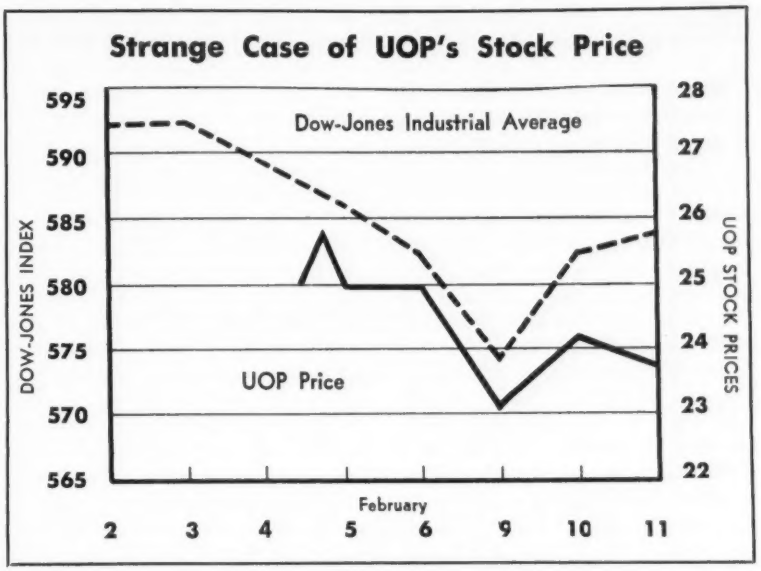
Seed for Growth: A complex of plants has sprung up at Grangemouth (Scotland) to draw on the BHC products. Forth Chemicals (owned by BHC and Monsanto) produces styrene monomer in a 30,000-tons/year plant. Grange Chemicals (subsidiary of BHC and Oronite) operates a 10,000-tons/year dodecyl benzene detergent plant. And Union Carbide's 12,000-tons/year polyethylene plant went into production there a year ago.

BHC is also the main supplier of ethyl and isopropyl alcohols for parent Distillers Co.'s 100,000-tons/year Hull complex.

Coming months will see still more expansion of the U.K.'s still-young petrochemical industry. Esso, with propylene capacity to spare, is seeking potential customers to interest in the Jersey Standard polymerization process. If Esso finds no takers, it may well follow Shell into polypropylene production.

Esso also is planning to put up a butyl rubber plant at Fawley, when it feels demand is strong enough. Esso's customer-neighbor at Fawley—International — now supplies all of the U.K.'s present needs.

And the trend toward petroleum raw materials may well lead to expansions in acetylene, benzene, glycerine, hydrogen peroxide, phthalic anhydride, isophthalic acid, sebacic acid, and acrylonitrile.



UOP Stock Nibbled by Bears

Vigorous selling followed quick buying of the $72.5 million worth of Universal Oil Processes stock last week—and brokers are still debating why investors suddenly turned bearish. The incident will be a factor in other CPI companies' decisions on equity financing this year.

Universal Oil Processes was set up as a new corporation by underwriters to acquire all the assets of Universal Oil Products (Des Plaines, Ill.). The stock will soon be changed back to the older company's name.

'Bulls' Take Fright: Underwriters offered UOP on Feb. 4 for $25/share. "Buy" orders flooded brokers' offices in every major city of the U.S. But on the following Monday, when the market suffered one of the worst declines of the year, UOP bulls lost enthusiasm, sold much of the newly acquired stock at a loss. Underwriters supported the price at $23/share.

Reason for the big sell-off is unclear. Observers say UOP was rumored to be a "hot issue" and, apparently, investors bought in without much investigation. Reading the somewhat bearishly written prospectus may have caused many to sell. There was talk, too, among insiders, that the offering price was high, relative to UOP's earnings outlook.

The following day, Tuesday, the market chalked up a big gain, and UOP rose to 24¼ bid, 24⅝ asked—up a little, but still short of the original price. By Friday, the stock had steadied. Monday quote: $24½.

No Fast 'Runup': Significant was the fact that UOP did not "take off," as some brokers had predicted. The thinking was that perhaps Wall Street had overestimated the public's appetite.

But, say most observers, the real thing that spiked an early runup was the prospectus itself. It pointed out "the recent declining trend of UOP's revenues and earnings," the "recent decline in new construction contracts written by Procon" (a subsidiary of UOP) and the fact that "UOP believes '59 may be its peak year in respect to its royalty income from UOP platforming process licenses."

Most feel that UOP definitely is a quality issue—good for the long pull. But for those expecting immediate gains, it was a disappointment.

Strong Research Staff: Bolstering its long-term prospects is a top research group. The company's R&D lab in Des Plaines has a staff of about 450, including 135 scientists and engineers. They work on new products, primarily catalysts, but also chemicals and processes connected with the oil business. Moreover, the company has applied for, and been granted, an impressive list of patents.

More Glitter for Aluminum

Despite admitted overcapacity and ever-stiffening competition, aluminum makers' enthusiasm keeps snowballing. Last week Reynolds Metals' new stock issue was a crackling success; Kaiser decided to add two more potlines to its Ravenswood, W. Va. complex; new hope came for an early debut of all-aluminum auto engines; and there was word of growing consumer preference for aluminum-built homes.

The new Reynolds issue was okayed by stockholders at a short meeting last week in the company's sleek headquarters building on the outskirts of Richmond, Va. Only a handful of stockholders showed up, though more than 70% of the 11 million outstanding shares were represented in person or by proxy.

The new issue—second-preferred, offering a 4½% dividend—reimburses the company treasury for the purchase of a 49% interest in British Aluminium Ltd.—huge British aluminum producer.

Tight Security Wraps: Little information about the purchase was revealed at the shareholders' meeting.

Reynolds' success in getting a big piece of the British aluminum maker has been regarded as a major corporate coup (*CW Business Newsletter, Jan. 17*). But SEC's "stop-gap" regulation on release of information concerning new issues before they are sold (*see p. 33*) spiked an opportunity for Reynolds management to inform stockholders on merits of the acquisition.

But there's little doubt that investors saw it as a major advance. The new stock was offered at $100/share on Wednesday, was immediately bought up and traded at $109¼ later in the day. Many feel such a run-up was unwarranted—since, on the same day, Reynolds common dropped 1¼ points. But the fact that the new stock is convertible into common at $75/-share may have influenced the sale.

Overseas Growth: Behind the quick sale also, of course, was a bullish outlook for aluminum consumption abroad. The acquisition will give Reynolds a firm foothold in Europe, with well-established plants and markets. Though Reynolds, by necessity, couldn't voice optimism officially, it's been said the company might have "bought an empire for the price of a small kingdom."

At about the same time Reynolds shareholders were meeting, a Kaiser executive—Vice-President and Treasurer Russell Clayton—was talking to security analysts in San Francisco. Clayton said his company will boost the capacity of its Ravenswood, W. Va., smelter from the present 537,000 tons/year to 609,000 tons/year by adding two new potlines during the first quarter of '59. Clayton bullishly noted that the move is part of a $400-million expansion program begun in '54 and slated for completion later this year.

Clayton also revealed that Kaiser's sales in '58 were up 9% over the previous year—despite recession cutbacks earlier in the year.

Earnings Lower: Earnings were slightly lower, and Clayton laid most of the blame on sharp increases in depreciation and depletion charges arising from new fixed assets that were a part of the expansion program. Income for '58 totaled $25.2 million vs. $26.8 million in '57. Depreciation charges were $36 million, compared with '57's $23 million. In '59, with more new plants being completed, depreciation could top $43 million, he added.

Also last week, word came that one of the "Big Three" auto firms will make and market a car with an all-aluminum engine block this year—and this, if it gains acceptance, could add vast new markets for the light metal. The probable innovator: General Motors. Expected debut: midsummer.

In housing, National Homes Corp., Lafayette, Ind.—after selling a record

WIDE WORLD

Midwest Flood Fighters Mobilize

In Terre Haute, Ind., flood-fighters late last week piled sandbags in an effort to hold back the rampaging Wabash River, rising toward a predicted crest of 24.5 ft. Chemical plants in the area—including those of Pfizer, Commercial Solvents, Industrial Gas & Chemical and Union Carbide's Visking Co. division—are out of danger on high ground.

And in the Toledo, O., area, managers of process plants were eyeing the Maumee River, bulging with ice and overflowing in some places.

number of new units in January—reports a 52% preference for aluminum-built homes.

And aluminum has been edging deeper into traditional steel markets. Two new aluminum-girder bridges are being readied for construction on Long Island in New York's metropolitan area. They'll be built on the Long Island Expressway at a cost of about $4.4 million each. This is somewhat more than the cost of comparable steel bridges, but the project is intended to give experience with aluminum, and as a hedge against a possible steel shortage this summer.

SEC Probes Stocks

Stepping up its investigation of stock manipulations, the Securities & Exchange Commission last week zeroed in on several investment firms and CPI companies.

Among the latter: Park Chemical (Detroit) and Borne Chemical (Malvern, Pa.)—whose prices on the American Stock Exchange doubled within a few hours, then fell back when SEC began probing.

After an investigation, SEC has not decided to bring action against either of the companies. Paul Windels, SEC's energetic New York investigator, declined to comment on the commission's findings, says only that "wide price swings always bear close watching."

Stock Price Soars: Borne first attracted attention in December when its stock price climbed wildly after news that the company had rights to a new plastic sealing process (*CW, Dec. 27, '58, p. 23*). Later, there were rumors that Du Pont was trying to acquire the firm.

Company officers confirm that Borne does have a plastic sealing process to be used, primarily, on dairy product containers. But how revolutionary the process is, or how much it will be worth to food packagers, is a matter for conjecture.

Borne President Thomas Betner flatly denied the Du Pont rumor. He revealed that his company is making some acquisitions itself—though Betner declined to reveal which companies Borne is negotiating with.

Borne makes oils, greases, rubber products, tinting compounds and textile specialties. It is a small company; '57 sales were about $1.8 million. The company posted a loss of $130,000 in '57.

Other Rumors Unfounded: Other rumors, hinting that American Can and Continental Can had offered Borne big contracts and that Borne had managed to score a striking success in development of a new missile fuel, were also firmly denied.

But even though no truth has been found in any of the gossip, Wall Street is still very interested in the company. Its stock price, which early in January was $32/share, had risen to $49/share late last week.

In the case of Park Chemical, speculation was equally wild—that it had developed a spectacular new drug, that it would merge with Hurd Lock Co. Park denied both rumors.

Park produces a line of specialty items and industrial chemicals ranging from auto waxes to ingredients for salt baths. It operates a small plant in the downtown area of Detroit, has annual sales of about $2.1 million and employs 80 people.

In another area, SEC's work has come under sharp criticism from industry, namely, Section 5 (c) of the 1953 Securities Act, which prohibits publicity—or at least publicity that can be construed to be promotional—on a new stock issue before it is registered with SEC. And the teeth in this rule were demonstrated when the U.S. district court in New York last week ruled against Arvida Corp. and two of its broker-dealer firms that were to serve as underwriters.

The defendants had been accused of using public media to create interest in a forthcoming stock issue. No penalties were levied, but the three firms were enjoined from "further violation" of the regulation.

Close-Mouthed on Issues: Though the Arvida case ended only in a reprimand, other companies are uncertain how the commission may view future announcements about security offerings. As a result, they've been unusually tight with information prior to new issues.

This new attitude was evident in the cautiousness of a Reynolds Metals' stockholders' meeting last week, when shareholders approved a new, second-preferred issue to finance a major acquisition (*p. 32*). Other firms about to sell equity also will likely be extracautious while SEC takes a most literal view of Section 5 (c).

Setting Sights Abroad

The pace of overseas chemical production and marketing by U.S. firms is quickening.

Du Pont's decision to build a 15-million-lbs./year Orlon plant in the Netherlands was the biggest news in last week's flurry of activity. Construction will begin later this year on a 40-acre site near Rotterdam, with startup slated for last-quarter '61. Design will allow capacity to be increased several times over.

This will be Du Pont's third plant outside the Americas. Its first—a neoprene synthetic rubber plant near Londonderry, Northern Ireland—is under construction, due onstream in '60. And it has started building a finishes plant in Malines, Belgium.

A major factor behind the decision to build the two newest plants is Du Pont's intention to meet competition within the rising walls of the European "Common Market."

The Orlon plant will produce staple and tow "mainly for customers in Europe, including the United Kingdom," Du Pont says. It will be operated by a new subsidiary.

Readying for Competition: Meanwhile, other U.S. companies are preparing for more vigorous competition abroad.

Continental Oil Co. has just formed a subsidiary in the Netherlands. Initially, it will push sales of Conoco's refined products, especially petrochemicals and specialty products. Conoco recently set up a foreign-department office in New York.

Atlas Powder is tightening its foreign operations with a new international division to handle all international sales and coordinate parent company activities with foreign distributors, affiliates, subsidiaries and licensees. The chemical division's international sales department and the explosives division's export sales section have both been shifted to the International Division.

Ansul Chemical and P.R. Mallory & Co. have both formed new subsidiaries to push foreign sales—Ansul's from Caracas, Mallory's from New York and Indianapolis.

And Mallinckrodt Chemical has a new sales outlet in Germany. It has signed an agreement giving Degussa (Frankfurt, Germany) exclusive sales rights on the Continent.

COMPANIES

Armour & Co. (Chicago) is merging its coated abrasives, cushioning products and adhesives operations into a new unit to be known as Armour Alliance Industries. It will be headed by Carl Johnson, formerly production manager of Armour's Soap Division.

•

Canadian Resins and Chemicals Ltd. (Montreal) is now a wholly owned subsidiary of Shawinigan Chemicals Ltd. (Montreal). Shawinigan—which previously had a 49% interest in Canadian Resins—has acquired the other 51% formerly held by Union Carbide Canada Ltd. (Toronto).

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S. B. Penick & Co. (New York) is consolidating its domestic operations into three newly designated divisions. NYQ Chemical Division takes over the old New York Quinine & Chemical Works Division and will handle antibiotics as well as fine and industrial chemicals. Other units: Botanical and Allied Products Division, Farm Chemical and Insecticide Division.

•

Wyandotte Chemicals Corp. (Wyandotte, Mich.) is purchasing Tesco Chemicals' Atlanta, Ga., plant. Takeover date: March 1. Wyandotte has double-barreled plans for this plant: it will continue to manufacture the Tes-Ted line of dishwashing, maintenance cleaning and automotive products; and—following expansion of the plant during March and April—will begin manufacturing at this location the Wyandotte-trademarked washing and cleaning compounds of Wyandotte's J. B. Ford Division.

Tesco will continue its industrial operations at a new location in the Atlanta area, as well as at its North Carolina and Florida plants.

EXPANSION

Ammonium Perchlorate: Pennsalt Chemicals Corp. (Philadelphia) plans to expand "by several thousand tons" per year its four-month-old ammonium perchlorate plant at Portland, Ore. The company also will expand by 25% its adjacent sodium chlorate unit, which has been in production since '42 and provides the principal raw material for ammonium perchlorate. Pennsalt says the perchlorate is "the most widely used oxidizer for high-energy solid-state missile propellents." Total cost of expansion: $2 million.

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Sulfuric Acid, Superphosphate: J. R. Simplot Co. (Pocatello, Ida.) is proceeding with construction of a 400-tons/day sulfuric acid plant and will now start building an addition to its triple-superphosphate fertilizer plant. Production of high-analysis fertilizer will be increased 65%, to about 175,000 tons/year.

Plate Glass: St. Gobain Industrial Corp. of France and a yet-unidentified U.S. company are negotiating on a plan to build a $40-million plate-glass plant in Kentucky, Ohio, Tennessee or Pennsylvania.

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Polyethylene Film: Union Carbide Corp. (New York) is building a polyethylene film plant on a 15-acre site near Cartersville, Ga., about 40 miles northwest of Atlanta. This plant—to be completed in July—will be the fourth plastics film plant operated by Carbide's Visking Co. division. When in full production, it will employ about 100 people.

•

Caustic Soda, Chlorine: Stauffer Chemical Co. (New York) is starting a $2-million expansion and modernization of its caustic soda and chlorine plant at Niagara Falls, N.Y. Production capacity will be increased nearly 25% and all plant facilities will be converted for 60-cycle (instead of the present 25-cycle) electric power. Electrical conversion work is to be completed by late spring; additional plant capacity will be ready for use by autumn.

FOREIGN

Petrochemicals/Austria: Part of a $4-million loan to finance petrochemical development in Austria will be floated in the U.S., under present plans of Austria's largest chemical enterprise, the government-owned Austrian Nitrogen Works. The funds will be used to build initial units of the $40-million Danubia Petrochemie complex planned for Schwechat, southeast of Vienna (*CW Business Newsletter, June 28, '58*).

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Chemicals/Turkey: A $6.1-million loan from the U.S. Development Loan Fund—plus U.S. and Italian know-how—will help build a new chemical plant near Istanbul, Turkey. Principal products: polyvinyl chloride resins, caustic soda, calcium carbide and related chemicals. The plant will be owned by a company to be formed as a joint subsidiary of Monsanto; two Italian firms, Sicedison and Oranzio de Nora, and a private Turkish manufacturing and trading concern, Vinylex Limited Sirketi. The new plant is expected to yield a foreign exchange savings of about $2 million/year.

•

Polypropylene/France: Two leading French industrial concerns—Pechiney and La Societe Normande de Matieres Plastiques—are planning to produce polypropylene in France. They have signed license agreements under the Montecatini-Ziegler patents, and propose to construct two new plants—each with capacity of 22 million lbs./year. Sites have not yet been reported, but the companies say construction will begin immediately and be completed in '60.

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BIGGEST YEAR

In its twenty-eighth year of shipbuilding—twenty years after incorporating as The Ingalls Shipbuilding Corporation—Ingalls set an unprecedented pace in the construction and repair of shallow draft vessels.

During the past 12 months, Ingalls' shipyard at Decatur, Ala.—largest and busiest on the Tennessee River—not only turned out great volume but demonstrated its ability to design and construct highly specialized vessels. Among these were: an insulated caustic soda barge for Westvaco Chlor-Alkali Division of Food Machinery and Chemical Corporation, a sulfuric acid barge for Consolidated Chemical Industries Division of Stauffer Chemical Company, 12 new hopper type barges for Seley Barges, Inc., and a Diesel-powered patrol boat for the U.S. Engineers. Many conventional type vessels were also delivered.

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Washington
Newsletter

CHEMICAL WEEK
February 21, 1959

Congress is gearing for a multicornered investigation into the pricing policies of chemical firms and other major industrial producers.

Big purpose of the inquiries is to determine to what extent "administered prices" are at the root of present inflation. It's an integral part of the over-all study of inflation and its relation to the slowdown in the nation's economic growth rate over the past half-dozen years—hottest political issue of the year.

This is precisely the area that will take up most of the attention of two Congressional groups this session—Sen. Kefauver's Antitrust & Monopoly Subcommittee and Sen. Douglas' Joint Economic Committee. Kefauver will concentrate on administered prices; Douglas will carry the ball for the over-all inflation and growth investigation.

Two new studies will be used by these politicos in digging into the murky area of business pricing policies. One was prepared for Kefauver by economist Gardiner Means, the man who first coined the term "administered prices" 25 years ago. The other was submitted to the joint committee by the Bureau of Labor Statistics.

Means' job as economist consultant dates back to New Deal days when he played a major role in the famous Temporary National Economic Committee studies of American business. His study for Kefauver classifies major industrial segments according to whether they are administered-price industries or not. Though the term "administered prices" has taken on political connotations, Means himself contends that the practice has had a beneficial effect, steadying the market and holding back a greater inflationary outbreak.

The studies show clearly that, by whatever the measure, chemicals will be classed with administered-price industries. At the same time, they show that CPI prices behave differently from those of other administered-price industries.

In the first period covered by the Means study—the years 1942-47—CPI firms stood at the very head of the major industrial industries in lifting prices. Chemical prices for the five-year period rose almost 50%. Other administered industries ranged lower, with the lowest hiking its tags slightly less than 25%.

The exact opposite proved the case in the latest period surveyed —1953-58. During this time, CPI firms stood at the very bottom of the list of those raising prices. Chemical prices rose less than 5% over-all, in contrast with the highest rate boost, almost 40%, registered by the steel industry.

In effect, Means clears CPI firms from adding significantly to the present inflationary spiral.

Both the Means and the BLS studies use as their sources the BLS index of wholesale prices—those prices paid by industry for large-lot purchases. Means does not classify the chemical industry as an outright administered-price industry, such as the steel industry. Instead, he uses the term "intermediate" industry, meaning one in which prices are set partly through management decision exclusive of market considerations, and partly by the pressures of the market.

The BLS study, set up to be as neutral as possible, does not use any of these terms. Instead, it classifies industries according to whether they are "flexible" or "inflexible" in setting prices. In general, those industries that are least flexible in changing prices are what Means terms administered-price industries. Least flexible industries changed their prices, in general, only periodically, and not as a rule from month to month in accordance with market shifts.

According to this classification, chemical firms were about the least flexible in changing prices.

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The Soviet trade drive on U.S. markets is picking up steam. Deals have recently been made involving sales of benzene, wood pulp, and scientific equipment from Russia, crude oil from Rumania, and purchase or attempted purchase by Russia of sheet steel and oil pipeline (*CW, Feb. 14, p. 27*). But now Russia's U.S. trading agency, Amtorg, has outlined lists of what it would like to buy and sell here.

The for-sale items include chrome, iron and manganese ores; cotton and linen fabrics; food processing machinery; electronic instrumentation; 35-millimeter cameras; small boats of the new hydrofoil type; and even passenger cars.

Wanted by Amtorg are chemical and plastic production machinery and equipment; chemical fibers; electronic equipment; machinery including machine tools and other metalworking equipment.

The lists are not wholly new, and some of the items run afoul of policy with regard to domestic producers and imports from Allies (in the case of shipments from the Soviet bloc) and export controls (in the case of shipments to the bloc).

But they do point up the Kremlin's intention to boost its U.S. trade, despite Washington's stand-pat East-West trade policy.

Commerce Secretary Lewis Strauss, however, has been working for tighter, not looser, controls on U.S. exports to Russia. Last week, for example, he put copper and copper alloys back on the "positive list" of items that must get specific approval for shipment even to friendly nations and that are usually banned from shipment to the Communists.

Copper was taken off the positive list last fall, under Secy. Weeks, when the U.S. agreed to ease somewhat its East-West trade controls in accordance with a decision of its Nato allies and Japan.

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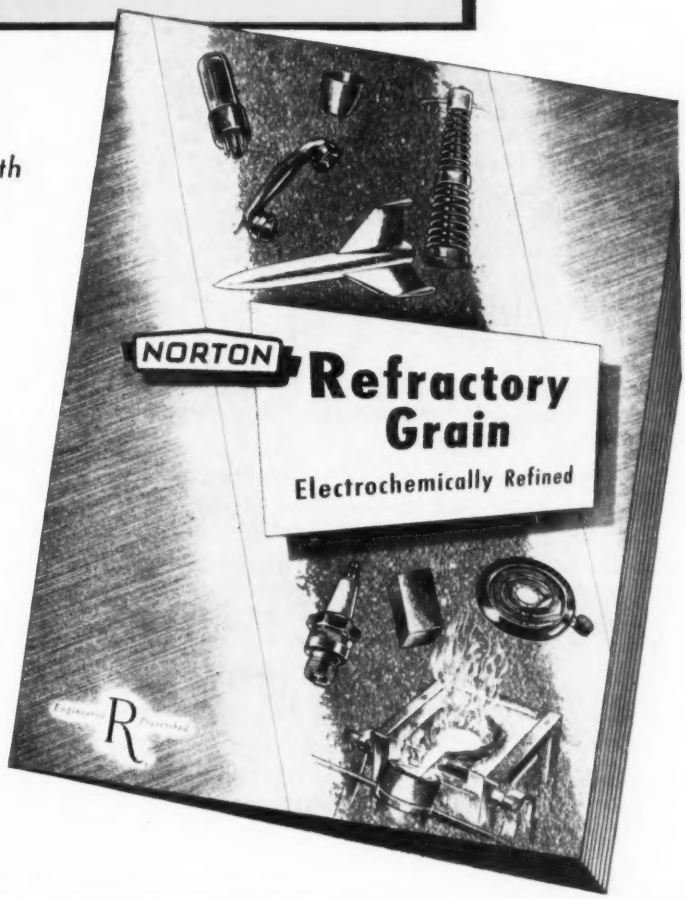

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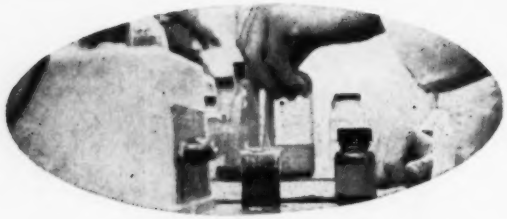

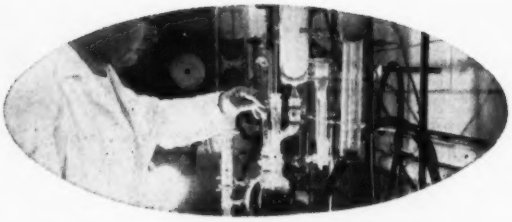

A look at today... and a glimpse

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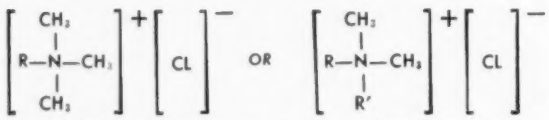
The chemical structures are as follows:



Mono-Alkyl Trimethylammonium Chloride

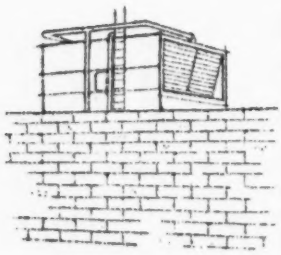
Dialkyl Dimethylammonium Chloride

"R" represents fatty acid derived long chain hydrocarbon

Where the Arquads work today

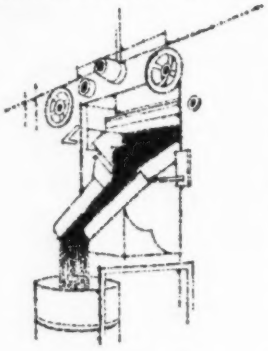
Fabric softeners: Unique properties are being imparted to textiles today by Arquad 2HT (dimethyl distearyl quaternary ammonium chloride). This Armour Chemical softens, sanitizes, permits faster drying, eliminates static electricity, speeds up ironing. It is compatible with starches, dextrins, glue, gelatin and the polyvinyl acetate and/or chloride emulsions. *For more data check "A" in the coupon.*

Liquid starches: Arquads are reducing and stabilizing the viscosity of liquid starches immediately after manufacturing and during storage. These chemicals also inhibit microorganisms, act as preservatives, increase the uniform deposition of the starch onto paper or fabric, and lubricate the dry starch film during ironing or calendering. *Additional information is available. Check "B" in the coupon.*



Industrial cooling systems: Slime, algae and fungi found in cooling towers and water conditioning systems are being inhibited by the Arquads at concentrations of 25 to 100 parts per million. These chemicals have been found to be highly effective against bacteria found in water systems. *Get more information. Check "C" in the coupon.*

Latex foam rubber: Large scale production of latex foam rubber is being made easier because of Arquad 12. This Arquad is an efficient and economical gel sensitizer and processing aid in foam rubber made from natural rubber latex or blends of natural and GR-S (butadiene-styrene) latices. It is nonstaining, increases gel strength and foam volume, reduces shrinkage—and is low priced. *For more complete information, check "D" in coupon.*



Pigment dispersion: Arquad 2C used with Ethomeen® S/12 (an ethoxylated amine) exhibits excellent pigment dispersing properties. It may be applied during preparation of the pigment in an aqueous system or during grinding of the pigment in oils. *Interested in this application? Check "E" in the coupon.*

Stability and compatibility

Arquads are stable over a wide pH range. The alkyl trimethyl derivatives are insensitive to the presence of low concentrations of water soluble salts, and are not precipitated by hard water. The dialkyl dimethyl quaternaries, however, are somewhat more sensitive to precipitation by di- or tri-valent salts.

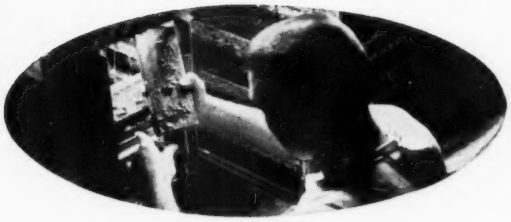
Arquads, being cationic surfactants, are not compatible with anionic materials such as soaps or common synthetic detergents.

Surface tension

Dynes/cm @ 25°C. Concentration—0.1%	
Water (as reference)	73
Arquad 12	33
Arquad 16	34
Arquad 18	34
Arquad C	31
Arquad S	34
Arquad 2C	30
Arquad 2HT	37

Solubility data

In the Arquad series, the mono-alkyl quaternaries are water soluble. The dialkyl quaternaries (Arquad



# of tomorrow

from Armour Chemical

2HT and 2C) are soluble in most hydrocarbons and a variety of organic solvents.

In water. Most of the mono-alkyl trimethylammonium chlorides are soluble in water at room temperatures over a relatively wide concentration range. Arquad 18 (the octadecyl quaternary), however, is soluble in water only at temperatures above 31°C.

The dialkyl dimethylammonium chlorides are essentially insoluble in water, although they may be readily dispersible. Stable dispersions of Arquad 2HT at a concentration below 7.5% (by weight of quaternary) in water can be consistently obtained.

In organic solvents. All of the Arquads are true salts, and tend toward insolubility in non-polar and slightly polar solvents. Exception is the solubility of these Arquads in chloroform and carbon tetrachloride.

The dialkyl dimethylammonium chlorides are more soluble in non-polar and slightly polar solvents than their alkyl trimethylammonium chloride counterparts. This property is the function of the second long chain radical.

Where the Arquads will work tomorrow

Extensive research and field testing is being conducted on the various Arquads in some of the following typical applications: flocculating aids in water clarification systems; cationic emulsifiers in asphalts; antimicrobial protection in cutting oils. Look to Armour for future announcements on these developmental projects.

Test and evaluate the Arquads. Find out how they can improve one of your finished products, solve a processing problem, or perhaps help bring out a new product. Armour's chemical specialists will help you determine the correct Arquad for your specific application. Send coupon or call today.

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ARMOUR CHEMICAL DIVISION

NEWS NOTES

Amsterdam, Holland. *The Staatendam*, Holland-America's new liner on the North Atlantic run uses 0.2 to 0.3% of Arquad 18-50 to eliminate static electricity in rubber floor coverings. The quaternary ammonium chloride used was produced by the London facilities of Armour Chemical, Ltd.

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Chicago. Armour has realigned its sales organization into 2 segments: Chemical Derivatives; and Fatty Acids/Industrial Oils. This change will improve customer service to meet the diverse needs of the chemical industry.

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New York. Manufacturers of fiberglas reinforced resin moldings are eliminating static electricity in the handling of the fiberglas rovings. An Armour quaternary, Arquad 12, is applied to the glass fibers during processing. Its use makes possible speedier and easier production of boat shells, chairs, skis, wall panels, and a host of other finished items.

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Washington. A patent was issued to Armour for an improved lime buffing composition comprising 65-80% Vienna lime, 12-18% of a saturated fatty acid having a titer of at least 40°C, 12-18% tallow and 1.5-5.0% of an N—alkyl trimethylene diamine, e.g. Duomeen® T.

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Chicago. A new Pigment Dispersion booklet has been recently published. Included are sections on Paints, Plastics and Rubber. It's available through Armour Chemical.

How can the Arquads help you?

Check here for more information on your field of interest.

☐ A ☐ B ☐ C ☐ D ☐ E

Send sample for this application: CW2-59

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CW PHOTOS—SERGE MARSH

Emery's Arthur Schubert: 'We'll continue to expand . . . into fatty-type derivatives . . . either by acquisition or construction, depending upon the need and the opportunity that may develop.'

Candlemaker Turned Jet-Age Competitor

As military planes streak along America's Arctic line of defense this week, their engines are lubricated by a product that had its beginnings a century and more ago in a Cincinnati candle factory.

The stretch of time between the candle-lit era and the jet age encompasses the history of Cincinnati's Emery Industries, Inc.—a history characterized by growth, innovation, dormancy and rejuvenation. And the change in products from smoky tallow candles to synthetic jet lubricants, says President John Emery, "offers a good illustration of our continuing diversification from fats and oils into organic chemicals."

The extent of the company's moves is evident from a glance at its product line.

Today, Emery's products include stearic and oleic acids; animal, vegetable, coconut fatty acids; modified fatty acids; fractionated tall fatty acids; hydrogenated tallow, castor, fish fatty acids and glycerides; plasticizers; fatty acid esters, including methyl laurate; pelargonic, capric and caprylic acids; dimer acid, azelaic acid; synthetic lubricant bases; the Sanitone drycleaning products; textile chemicals; glycerine; and miscellaneous derivatives.

Lard to Lubricant: The pathway to jet-lubrication esters was actually a logical flight of steps—and it typically illustrates Emery's development. The lineage of the synthetic jet lubricant goes back to 1840, when Thomas Emery, Sr., was producing lard oil (for illumination) in his Cincinnati plant. Tallow soon replaced the lard oil, and the manufacture of candles followed. But the candles smoked a lot; and that led to the splitting of tallow into oleic and stearic acids, the latter being used for the production of smokeless and greaseless candles. The oleic was put to work, too, and research led to two more offspring of that material —azelaic and pelargonic acids. These found their way into manufacture of a group of plasticizers marketed under the name Plastolein. Later, esters of azelaic and pelargonic wound up as the base fluid for the synthetic lubricant.

The company has always heavily stressed research, and has developed a liking for the phrase "pioneering spirit." Initiation of this "pioneering spirit" is usually attributed to Ernst Twitchell. He joined the company in 1886, invented the Twitchell process of hydrolyzing fats, which revolutionized the fat-splitting industry.

The pioneering spirit seemed to falter a bit after that—until John Emery, Jr., the present head of the corporation, took over in 1924.

He took the reins from a board of directors, which was running the company ("mostly downhill," according to one company executive), brought new blood into the company, and recharged the batteries to release the "pioneering spirit."

Wet Drycleaning: In the early '30s, the company introduced Sanitone, a patented drycleaning process. It replaced bone-dry methods of drycleaning with one using enough water to remove water-soluble soil. The company was furnishing the oleic acid used in the drycleaning soaps marketed at that time. While seeking a better raw material, the company researchers found that it wasn't only soap that did the cleaning but the water in the soap. And this led to—or back to—petroleum sulfonates, the main constituent of the Sanitone product. (Work with the sulfonates at Emery dates back to 1917, when Emery acquired the Petroff patents. These concerned the heavily sulfonated substances called mahogany oils, by-product sludge from the manufacture of white oils from lube stocks.)

In '58, the company came out with a new synthetic Sanitone, called 30-90 to replace the standard Sanitone produced in '32.

In the late '30s, Emery developed the Emersol process to separate solid

fatty acids from liquid counterparts by selective solvent crystallization. It did away with pressing methods, turned out better-quality stearic, oleic and special fatty acids. Not long after that came the Colgate-Emery process, a continuous, high-pressure hydrolysis of fats.

The Plastolein plasticizers followed shortly after World War II, when Emery had established a method of oxidizing oleic with chromic acid—the first known commercial application of this method. Because of corrosion problems and the cost of regenerating chromic acid, however, the company researchers looked around for a new approach. They found it in ozone oxidation.

Explosive Start: "That was real pioneering," declares Emery. "In fact, the difficulties in taming ozone on a plant scale became evident in several devastating explosions. Luckily, these bugs were eliminated and a safe process was developed after a considerable expenditure of technical effort—and, of course, money."

Another postwar development from Emery research stemmed from a hunt for a practical method of producing superior fatty acids. Researchers reproduced earlier work on the polymerization of polyunsaturated acids as a means of eliminating relatively unstable constituents from commercial oleic acid. In extending this work, they came up with a dimerization process by which unsaturated fatty acids were converted into dibasic acids of unusual structure. This opened new markets for Emery in such fields as urethane foams, polymeric resins, surface coatings and corrosion inhibitors.

Do-It-Yourself Effort: Licenses to most of the Emery-pioneered processes have been offered to other companies. But there are some indications that the company is swinging away from this, beginning a period of expansion in which it will exploit the processes it develops.

The recent $4-million joint venture with Monsanto Chemical Co. is an example of such expansion. A plant located at Nitro, W. Va., processes crude tall oil (barged up from Florida) into high-grade tall fatty acid and rosin. Monsanto uses the rosin in its line of paper sizes, and the fatty acid broadens Emery's line, provides a new source of raw material for derivatives such as Emery's dimer acid. And it's not surprising that Emery executives speak guardedly of the possibility of a dimer acid plant at Nitro in the future.

Additional plants like those at Nitro—which make use of acidulated sulfite liquor wastes—are also a distinct possibility in Emery's future.

Other examples of expansion are the newly acquired plant in Los Angeles, which specializes in coconut derivatives, and a plant in London, Ont., to serve Canadian markets.

Negotiations are now going on with Unilever for a joint venture in Rotterdam to manufacture oleochemical derivatives. Here—though company executives won't definitely verify it—there's a strong possibility of an ozone plant. This won't be the first dealing Emery has had with Unilever; the latter is already using the Emersol process in its manufacturing setup.

If Emery is talking about putting together an ozone operation in Europe there's a strong possibility that a dimer plant will somehow figure into Unilever-Emery negotiations.

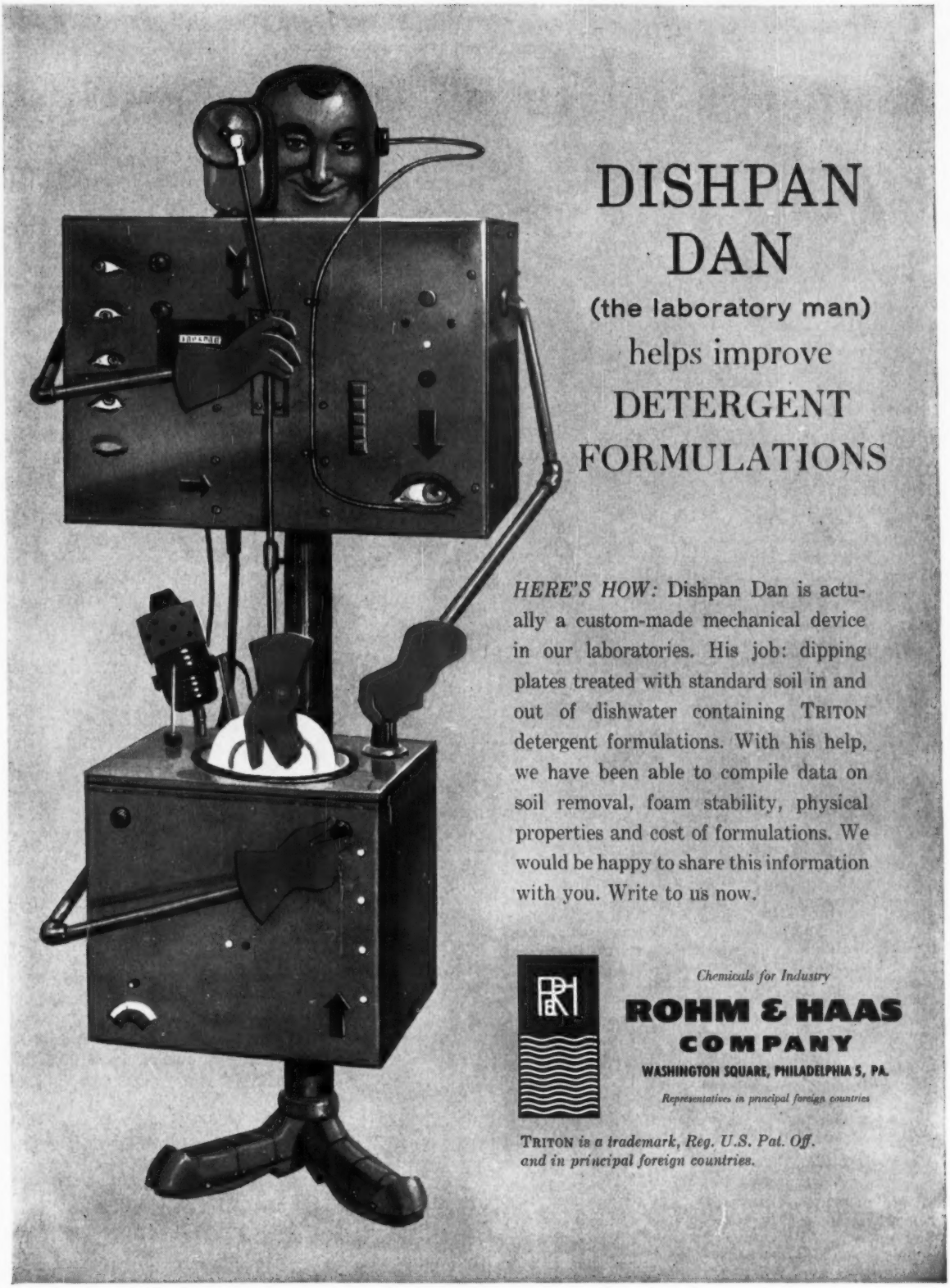
Cleaning Up: Though most of the talk about the future plans concerns the newly developed processes, Emery officials exude confidence when discussing the growth of the tried-and-true Sanitone process. This is somewhat surprising, since Emery no longer has the strong patent position it once enjoyed in this field.

Emery's feeling that it will stay ahead of the pack in supplying this type of product is based on the company's long history of heavy consumer advertising in this field. The company also provides a complete merchandising program for its 1,800 franchised dealers.

Emery is pushing Sanitone more vigorously in international markets, recently inaugurated a licensing arrangement with Australian drycleaners—adding them to Sanitone-licensed colleagues in Canada, Mexico and New Zealand.

Emery of Emery: President John J. Emery, 61-year-old head of Emery Industries,* directs the operation of that

* As well as being president of Emery industries, Emery is also head of a real estate concern—formerly the largest landowner in the Midwest—known as Thomas Emery's Sons, Inc. The real estate company built Cincinnati's Terrace Plaza Hotel (later sold to Hilton) and it still owns the Carew Tower (the town's tallest building) and the adjoining Netherlands Hilton Hotel (which it leases to Hilton).



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company from executive offices in the Carew Tower in Cincinnati. He's the grandson of English-born Thomas Emery Sr., who, before getting into real estate and lard oil ventures, tried unsuccessfully to raise silkworms in Kentucky. President John Emery and Arthur W. Schubert, executive vice-president, serve as an executive committee of two, and next in the management line are Robert Van Tuyle, vice-president in charge of manufacturing and research, and K. K. Boyd, vice-president in charge of the chemical products division. The company now has about 750 employees, including some 30 salesmen for the chemical products; 50 for the Sanitone product line.

Going Public: There's one definite tip-off that Emery may be preparing for big things in the future. Executive Vice-President Schubert told *CW* that there will be a substantial expansion of Emery's research efforts — the company will greatly enlarge its 70-man research staff in the next five years. Although Emery is turning out more fatty acids than ever (it's the world's leading supplier), the direction the company seems to be taking is toward self-exploitation of its research findings.

The company won't completely reverse its policy of licensing but it will give more consideration to the possibility of turning out products itself, rather than teaching other people how to do it.

Emery seems on the verge of a major growth program, and there's little chance that any of this growth will take place in fields in which the company doesn't already have a strong backlog of technical know-how. This attitude is reflected in Arthur Schubert's statement: "We have built a reputation as a dependable producer of quality chemicals for industry. Right in this field of fatty acids and their derivatives, there are so many opportunities for diversification and expansion that there is little reason for us to go into areas that would require a new approach."

He won't say whether the company is now making plans for going public, but concedes: "It's obvious that the results of accumulated research is leading the company into a period of substantial growth and that we ultimately will have to move in that direction."

Photo taken at Delaware Refinery, Tidewater Oil Company

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Feeding the big catalytic crackers takes close coordination of refining and chemical technology. Leading refiners and Cyanamid chemists worked together to pioneer the development of synthetic cracking catalysts, the first fully regenerative platinum reforming catalyst, the first high alumina catalyst.

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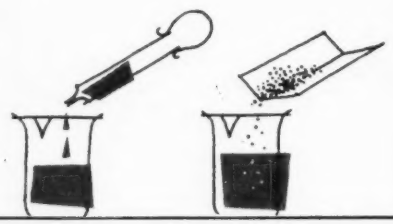
finding the hard-to-find

A common analytical problem is measuring minute amounts of a compound in a mixture. Ordinary methods of analysis frequently cannot be used because the sought compound is present in such a low concentration or because other substances are present which interfere. Ordinary isotope dilution techniques* may be impractical because the compound cannot be obtained in radioactive form, or because the isolation step is too difficult.

*For such tough problems the radioisotopic derivative method** is ideal.* The chemist simply converts the sought substance into

** See Nuclear-Chicago Technical Bulletin No. 1.*

*** We have prepared a technical description of procedures used in the radioisotopic derivative method as applied in quantitative analysis and will be glad to send you a copy. Ask for Technical Bulletin No. 3.*



1. Form a radioactive derivative of the substance by adding an easily obtained radioactive reagent to the mixture.

2. Add some *non*-radioactive derivative, chemically identical with the desired derivative.

For most radioisotope applications, only a minimum of nuclear instrumentation is needed. Here standard Nuclear-Chicago instruments have been assembled to illustrate the simple, inexpensive equipment required to measure beta and gamma radiation. Complete nuclear laboratories for radioactive sample measurements can be purchased for less than $3,000.

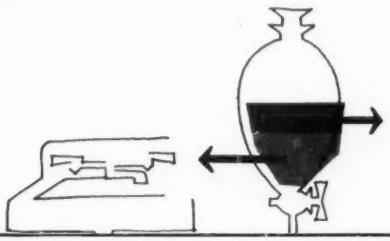
is a job for radioisotopes

a *radioactive* derivative by reaction with a radioactive reagent which either can be purchased or made readily from commercially available radioactive compounds. A relatively large amount of the same derivative, but *non*-radioactive, is added as carrier and a pure sample is isolated. The carrier greatly simplifies the problem of isolating the derivative. Radioactivity in the isolated sample is compared with the radioactivity in the original radioactive reagent. A simple calculation then yields the amount of sought compound in the original sample. Accurate results are possible where even less than 1 microgram of the sought substance is present.

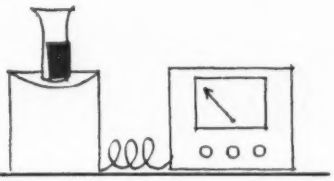
The radioisotopic derivative method has been used in clinical analysis for such problems as the measurement of histamine in animal tissues and the adrenal hormones in blood. It is equally applicable in industrial problems where the amount of a substance in a mixture must be determined. The amount of radioactivity needed is generally so small that no red tape or special precautions are necessary.

★ ★ ★

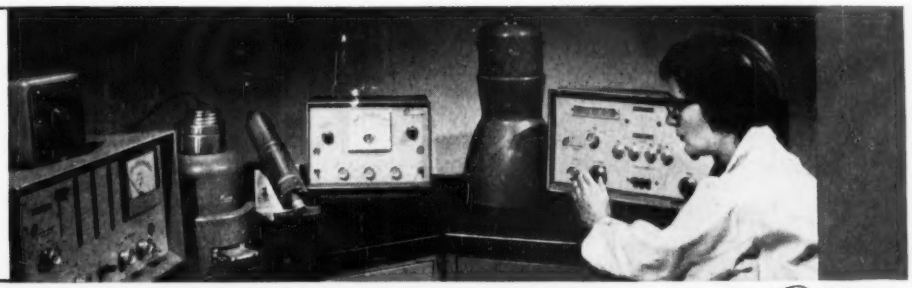
Designing and manufacturing high quality, dependable instruments for measuring radioactivity has been our business at Nuclear-Chicago for more than twelve years. We are a leading source for Research Quality Radioactive Reagents, too. From a single instrument to a complete radioisotope laboratory, we can offer you the finest and most practical equipment for your needs. We would be pleased to have you consult us on equipment needed for a progressive program in this field.



3. Isolate the desired derivative. A completely pure state is not required, provided the impurities are not radioactive, and the degree of purity can be assayed by some ordinary means.



4. Measure the radioactivity in the isolated sample and compare with the radioactivity of original reagent.



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New coupon scheme is national advertisers' weapon against competition by private-label brands.

Coupons to Clip Private-Labelers' Wings?

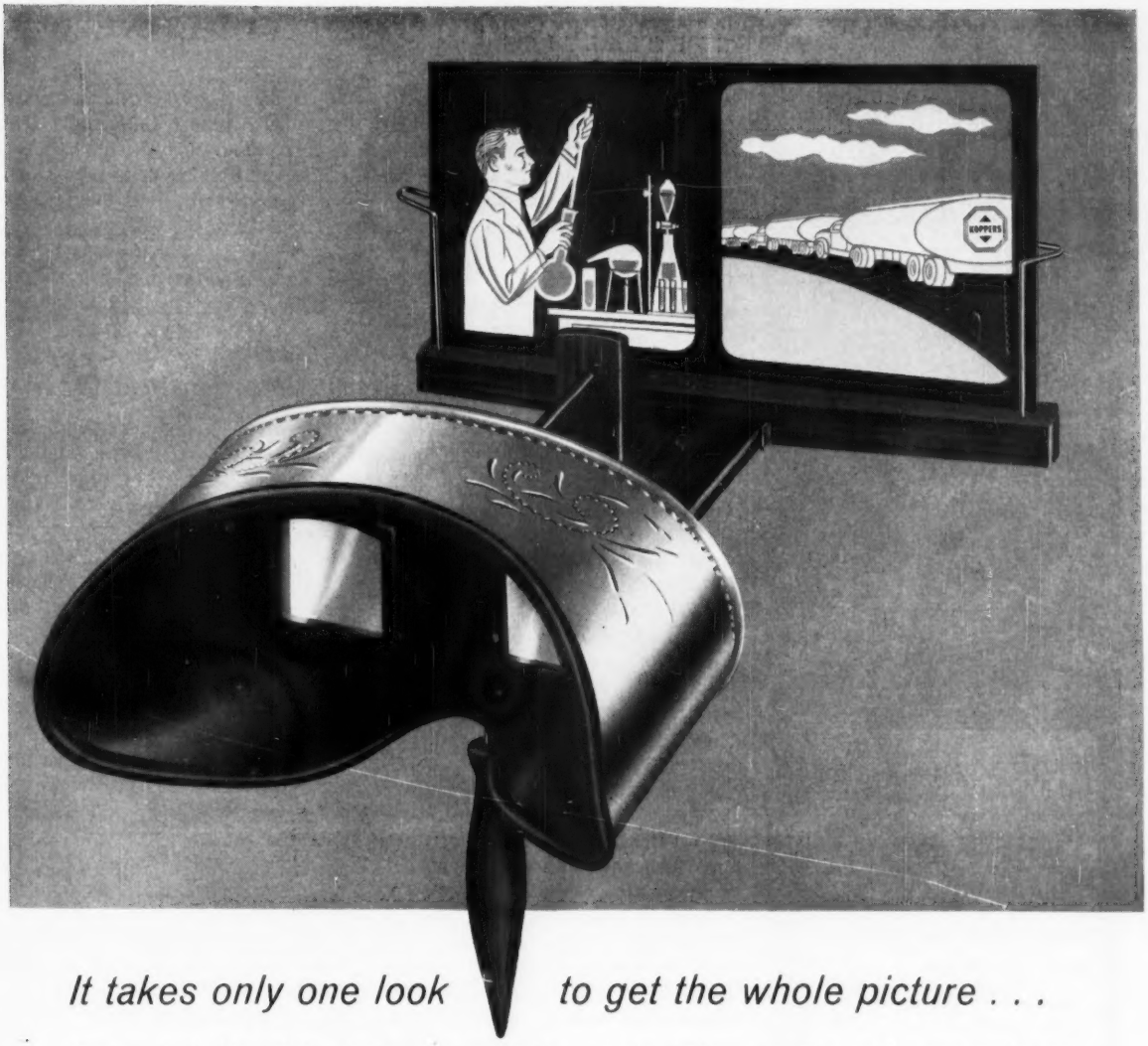
As private-label products take over more and more of the grocer's limited shelf space, makers of brandname specialties are being forced to come up with stronger consumer-wooing devices. This week, makers of nationally advertised specialty products are trying out a brand-new couponing gimmick.

It's a periodical called *Coupon Magazine*, available this week to thrift-conscious shoppers in 10,000 Mid-Atlantic groceries — 4,000 supermarkets and 6,000 smaller grocery stores. According to Roy Ald, publisher, 2 million copies have been presold on a nonreturnable basis to food chains such as Grand Union Co., First National Stores, Inc., Loblaw, Inc., American Stores Co., and Food Fair Stores, Inc.

Second issue of *Coupon Magazine* (it's a bimonthly) will appear in April with a Pacific Coast as well as a Mid-Atlantic edition. Ald hopes to have a Midwest edition by the end of June, plans to eventually have national distribution with several regional editions.

Clip at Home: The housewife buys the magazine in the store for 20¢, then buys a product advertised in the magazine. At home, she clips the magazine coupon relating to that product, along with a portion of the product's label (as shown on the coupon). Then she sends the coupon and the label to *Coupon Magazine*. Each coupon has a different redemption value. If the housewife returns all the coupons in the magazine, she receives a $5 check. This way, says *Coupon Magazine*, the grocery checker has no money to refund, no stamps to count out, no coupons to collect—and the customer has satisfied her thrift impulse.

All products advertised in *Coupon Magazine* must have complete regional distribution; no privatel-label advertising gets space in the book. Advertisers contract to take a spread at a cost of $3,000/1 million copies. Coupon redeeming is handled by a



It takes only one look to get the whole picture . . .

You get both sides of the picture when you look to KOPPERS . . . not only the best in resorcinols, dye intermediates and fine chemicals but also fast, dependable, quality service. KOPPERS technical "know-how" and complete laboratory facilities are available to answer your questions and to assist in solving any problems. Our plants are equipped to make uniform batch runs for you, using any KOPPERS chemical intermediates. Service is only as far away as your phone. Call your KOPPERS representative at the nearest branch office for "in-line" price information. Prompt delivery on all shipments—special service in emergencies.

Samples and information available upon request.

Koppers produces these fine chemicals and intermediates:

RESORCINOL AND RESORCINOL DERIVATIVES • ANTHRAQUINONE DERIVATIVES
NAPHTHALENE DERIVATIVES • AROMATIC AMINE DERIVATIVES
AND MISCELLANEOUS CHEMICALS

KOPPERS®

KOPPERS COMPANY, INC.

CHEMICALS AND DYESTUFFS DIVISION
Pittsburgh 19, Pennsylvania

PLANTS: Lock Haven, Pa. • Petrolia, Pa.

BRANCHES: Providence, R. I. • Philadelphia, Pa. • Paterson, N. J. • Chicago, Ill. • Charlotte, N. C. Chattanooga, Tenn. • Columbus, Ga. • Los Angeles, Calif.

IN CANADA: Dominion Aniline & Chemicals, Ltd., Toronto, Ontario

single agency, Statistical Tabulating Inc. (Chicago). For an additional cost of 1¾¢ per coupon redeemed, advertisers obtain additional marketing data on their products—address and name of customer, size of family, income and seasonal and regional trends.

First Nighters: Specialty makers advertising in the first issue of *Coupon Magazine* include Bristol-Myers Co., with Ban deodorant; Lever Brothers, with Pepsodent toothpaste and Wisk liquid detergent; Colgate-Palmolive, with Vel detergent; Dow Chemical Co., with Saran Wrap; The Drackett Co., with Twinkle Copper Cleaner; and Lanolin Plus, Inc., with five cosmetic products.

Although it's still too early to tell how effectively the device will increase brandname product sales in grocery stores, *Coupon Magazine* has a few predictions. Ald says the magazine's advertisers can expect to sell 25% more of their products to grocers. He adds that they should expect a coupon redemption between 8-25% of total coupon circulation. And, if grocery store sales grow as he forecasts, there'll be a drugstore and department store edition, too.

Specialty makers, however, are less optimistic. *CW*'s spot-check of *Coupon Magazine*'s first-issue specialty advertisers shows that specialty makers are neither optimistic nor pessimistic about the future of the new couponing idea. Says one spokesman at Lever Brothers, "We're waiting to see this child walk."

Pressure On Drugs

There's no point in using a hypodermic needle to put drugs into the bloodstream, if you can do the same job — painlessly — with an aerosol spray. That's what Morris Root, technical director of G. Barr and Co. (Chicago), told Pharmaceutical Manufacturers Assn. members at their Chicago meeting last week.

He pointed out that aerosol spray inhalants, now being used successfully for administering asthma and cold-relief remedies, suggest a similar medium for other drugs commonly administered by injection. Root believes that the lungs would transmit the drugs to the circulatory system almost as rapidly as intravenous injection does.

Another idea: aerosol dispensing of prescription ointments. Drug houses would supply the pharmacist with ointment-filled aerosol containers that would permit push-button filling of small jars.

Root predicted that some 17 million aerosol drug units will be produced in '59, up 11 million over '57's 6 million units.

By Prescription Only

Nasal inhalers containing basic amphetamine (benzedrine sulfate) may now be sold only by prescription, according to a new Food & Drug Administration ruling that went into effect last week. Previously, this type of inhaler — an aid to relieving nasal congestion — had been sold directly to the public.

The action, says FDA, was prompted by misuse of the inhalers for nonmedical purposes. Some purchasers removed the wicks and used the drug as a substitute for amphetamine tablets. Amphetamine tablets have always been restricted to prescription sale.

PRODUCTS

Pure Polytung: Pure Polytung Oil, a tung oil processed by a high-temperature thermolizing operation, is now available from Degen Oil and Chemical Co. (Greenville Station, Jersey City, N.J.). Degen is recommending its new tung oil for clear oil protective coatings and cold-cut varnishes.

•

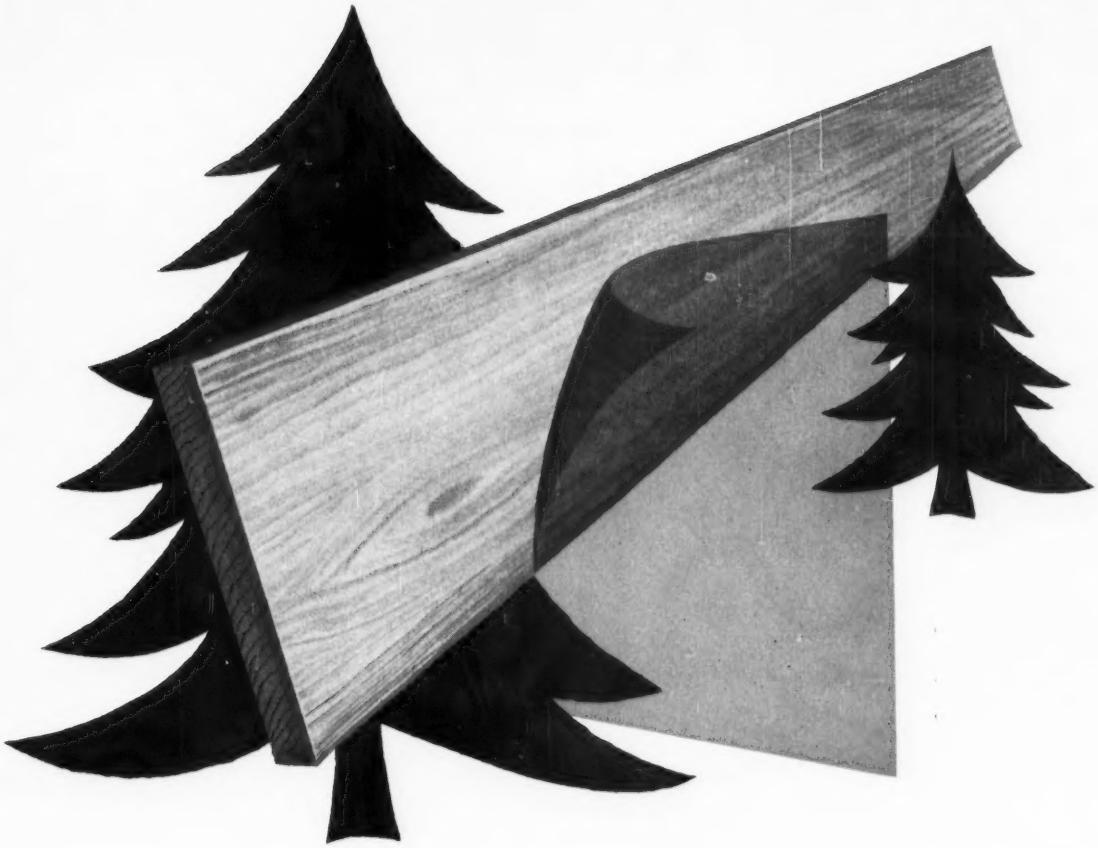
Hydraulic Fluids: Socony Mobil Oil Co., Inc., is now marketing a new line of synthetic fire-resistant hydraulic fluids. The new fluids, Mobil Pyrogard Nos. 42, 43, 53 and 55, available in four different viscosities and two different types, are recommended for use in heavy-duty installations involving radial-piston pumps and high pressures.

•

New Lake for Ink: Lake Alumina, a new printing ink and pigment base, is now being offered by the Aceto Chemical Co., Inc. (Flushing, N.Y.).

•

Tableted Vitamins: Vigran Chewables, a fruit-flavored vitamin supplement in soft tablet form, have just been introduced by Squibb, division



Another success story of Shawinigan acetal resins

wood sealers

Shawinigan Resins' Butvar (polyvinyl butyral) and Formvar (polyvinyl formal) are used in sealers for pine lumber to prevent bleeding of knots, resin ducts, and heartwood. The sealers restrict bleed-through of terpinaceous matter which causes embrittlement and discoloration of topcoats particularly evident on white or light colored trim. In addition to their excellent sealing action, Butvar and Formvar based sealers give outstanding intercoat adhesion, holdout and build.

This is just one illustration of how acetal resins are being used to advantage in industry. These versatile resins might be the answer to your product improvement problem.

Polyvinyl acetal resins, Butvar and Formvar, are unusual polymers because they contain three different functional groups distributed in the molecular chain. Available in a variety of molecular weights and chemical compositions, the acetal resins are compatible with a wide range of resins and plasticizers. This variety of grades allows users great flexibility in the choice of solvents.

Under suitable conditions Butvar and Formvar are reactive with phenolics, melamines and other thermosetting resins, and, even in fairly minor quantities, impart significantly improved adhesion, toughness and flexibility. Why not put these unique properties to work in your product. We'll be glad to help. Write for full information and product literature to Shawinigan Resins Corporation, Dept. 1107, Springfield 1, Mass.

Shawinigan does not produce wood sealers . . . we supply acetal resins which make them possible.

SALES OFFICES: ATLANTA CHICAGO LOS ANGELES
NEW YORK SAN FRANCISCO

FORMVAR® ***polyvinyl formal and***
BUTVAR® ***polyvinyl butyral resins by***

SHAWINIGAN RESINS

SPECIALTIES

of Olin Mathieson Chemical Corp. Squibb says that each Chewable contains at least 125% of the minimum daily requirement of vitamins A, D, B_1 and B_2, plus significant amounts of other essential vitamins. Vigran Chewables are available in bottles of 30 or 90 tablets.

•

Fire-Killer: The Fyr-Fyter Co. (Dayton, O.) has just developed a new sodium bicarbonate powder for fire fighting. Called Formula H, the new product is said to contain a liquid synthetic resin that forms a protective film around each granule of sodium bicarbonate, thus assuring optimum powder flow.

•

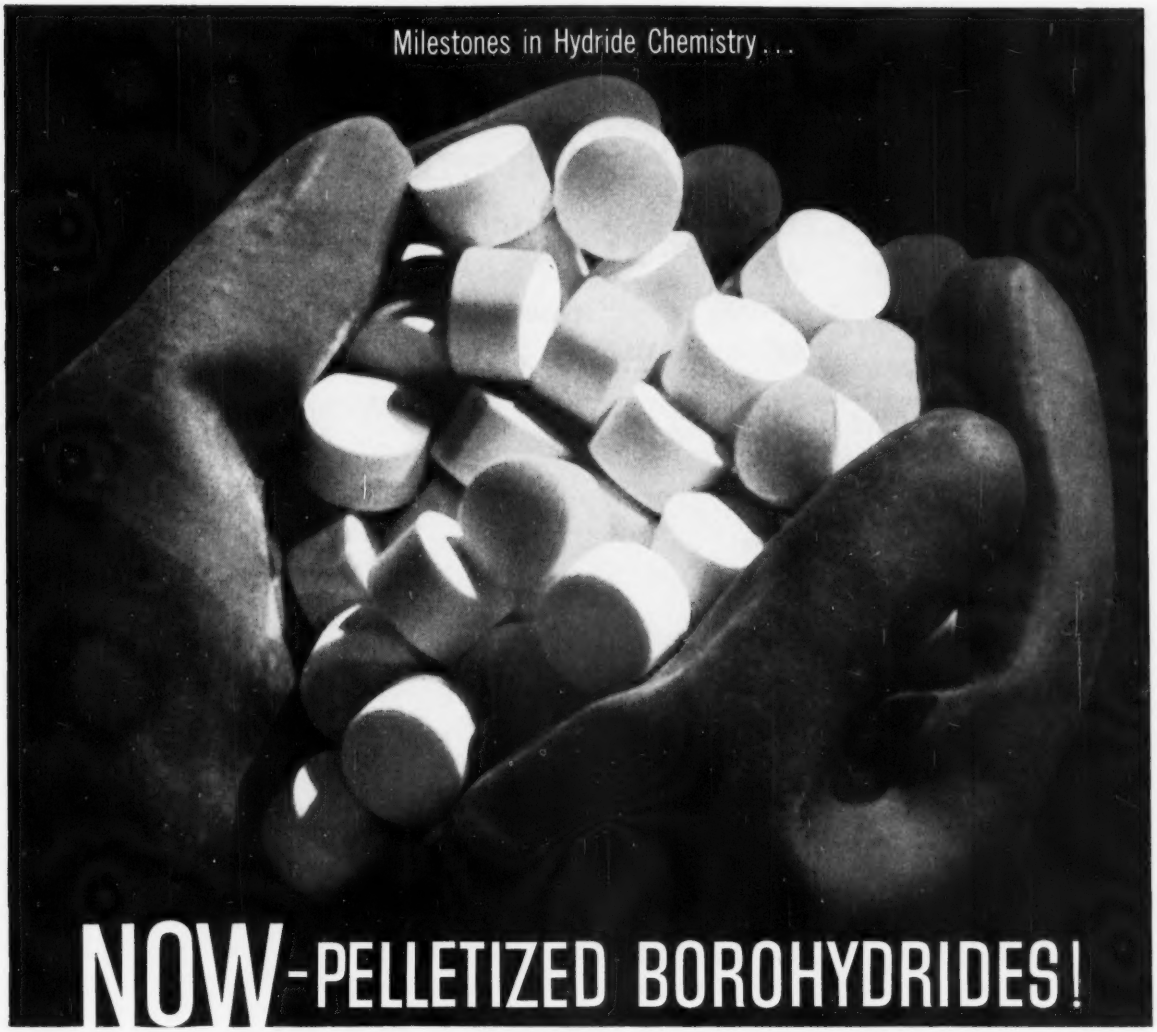
Bacteriostatic Rinse: A water-white, odorless liquid laundry rinse, called Puratize Protective Rinse, has been introduced by Puratize Inc., an affiliate of Gallowhur Chemical Corp. (Ossining, N.Y.). It's designed to be added to the final laundry rinse, either by hand or metered, at the rate of 2 oz. of concentrate per 100 lbs. of wash. It's said to act as an immediate sterilant, render laundry "lastingly bacteriostatic."

EXPANSION

Selig Buys Hygeian: The Selig Co. (Atlanta, Ga.) has just purchased Hygeian Chemical Co. (Louisville, Ky.) for about $35,000. Simon Selig, Jr., president, said that construction will begin next fall on a new 25,000-sq.-ft. plant and office in Louisville for the new Selig Chemical Co. The Louisville unit ups the number of Selig's plants to seven. Hygeian, formerly a chemical jobber, will now make and sell Selig's line of insecticides, disinfectants, soaps, waxes, detergents and related products.

•

Plan '59: Acrolite Products, Inc. (West Orange, N. J.), pushing its Plan '59, says that it will spend $200,000 on expansion. Murray Poznak, president of Acrolite, plans to increase production facilities, step up private labeling, add a paint-matching department, relocate the company's plant and sales offices, improve laboratory and control methods, and bring out a new line of acrylic lacquer paints this year. Sales of Acrolite's aerosol products were up 30% in '58 over '57.



For continuous fixed-bed, in-stream carbonyl group and peroxide reductions

High purity MHI sodium borohydride and MHI potassium borohydride are now available in smooth, cornerless pellets. Simplifying handling and eliminating dust, the new pelleted borohydrides open applications in fixed-bed purification to remove carbonyl or peroxides from gaseous or liquid olefins, diolefins, alcohols and glycols, amines and aminoalcohols, ethers and polyethers, acrylonitrile and chlorinated hydrocarbons.

Sizes of the new pellets are 10/32″ and 24/32″ in diameter. Bulk density averages five pounds to the gallon. The pellets are hard and resist crushing or dusting. Further information and technical service is yours without obligation. Write, wire, or phone today!

New, too! $NaBH_4$-SWS Write for complete details concerning MHI Sodium Borohydride SWS — the new stabilized water solution form that cuts the price of $NaBH_4$ more than in half!

CHEMICAL HYDRIDE DIVISION

Metal Hydrides Incorporated

PIONEERS IN HYDRIDE CHEMISTRY

221 CONGRESS STREET, BEVERLY, MASSACHUSETTS

Adsorption and Lubricity Properties of **Fatty Nitrogen*** Chemicals May Improve Your Product, Too

In textile conditioners, General Mills Aliquat H226 adsorbs on fibers, making them soft and silky

A monomolecular film has been electrochemically adsorbed on these terrycloth fibers (enlarged 80 diameters in the above photo). The cloth was treated with a textile conditioner based on one of our fatty nitrogen chemicals. These conditioners can be used to confer softness to all kinds of fabrics. In home use, they are added to the final rinse.

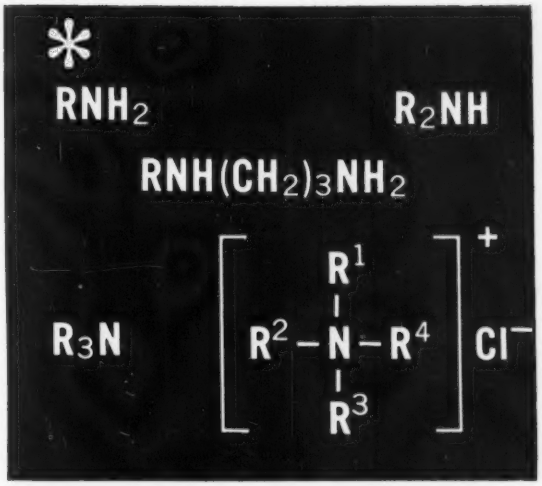
Imaginative chemists have discovered that premium grade textile conditioners for both home-use and commercial markets can be formulated with only a small amount of Aliquat H226. Aliquats, our trade name for quaternary ammonium chlorides, are one category of products in our complete line of fatty nitrogen chemicals.

The positively charged fatty quaternary ammonium ions adsorb on the negatively charged surface of textile fibers, imparting lubricity to improve fabric body and feel, speed the rate of dry, minimize static charge, make ironing easier.

Our staff of skilled service representatives, backed by extensive research facilities, is ready to share its experience with you in fatty nitrogen chemistry. With a little imagination, chances are you can use fatty nitrogen chemicals to improve your product or process.

Unique properties of the fatty nitrogen chemicals suggest uses in many fields. They already have proven applications in petroleum additives, as ore floatation reagents, hard rubber release agents, corrosion inhibitors, bactericides and chemical intermediates—in addition to their use in textile conditioners.

WRITE FOR this new Fatty Nitrogen Chemical specification and data folder. For a copy, address: Chemical Division, General Mills, Department 219, Kankakee, Illinois.



Above left, fatty primary amine; *above right*, fatty secondary amine; *center*, fatty diamine; *lower left*, fatty tertiary amine; *lower right*, fatty quaternary ammonium chloride.

These General Mills high quality Fatty Nitrogen chemicals are reactive organic compounds, derived from fatty acids of varying molecular weights and different degrees of saturation. The alkyl chain linearity of the parent fatty acids is carried over to the Fatty Nitrogen derivatives.

These key properties make Fatty Nitrogens extremely promising in many industries:

- ☑ SURFACE FILMING—Fatty nitrogen derivatives adsorb on metal as a monomolecular film and protect the metal from corrosive environment.
- ☑ SELECTIVE ADSORPTION—Fatty amines preferentially adsorb on certain non-metallic mineral surfaces; this surface modification enables the separation of ore components.
- ☑ CHEMICAL REACTIVITY—The fatty nitrogen derivatives are unique building blocks for organic chemical synthesis.
- ☑ SOLUBILITY—The fatty nitrogen derivatives have characteristic solubilities in a wide variety of polar and nonpolar solvents.
- ☑ SURFACE ACTIVITY—The fatty nitrogen derivatives are cationic emulsifiers, wetting agents and detergents.
- ☑ BIOCIDAL ACTIVITY—The fatty nitrogen derivatives inactivate certain bacteria, fungi and algae.
- ☑ BASE EXCHANGE—The fatty nitrogen derivatives can replace inorganic ions in clays to make the clays compatible with organic liquids.
- ☑ LUBRICITY—Fatty nitrogen derivatives, electrochemically adsorbed on fibers and fabrics, lubricate the individual fibers and confer softness.

CREATIVE CHEMISTRY FROM KANKAKEE SERVES INDUSTRY WORLD-WIDE

CHEMICAL DIVISION

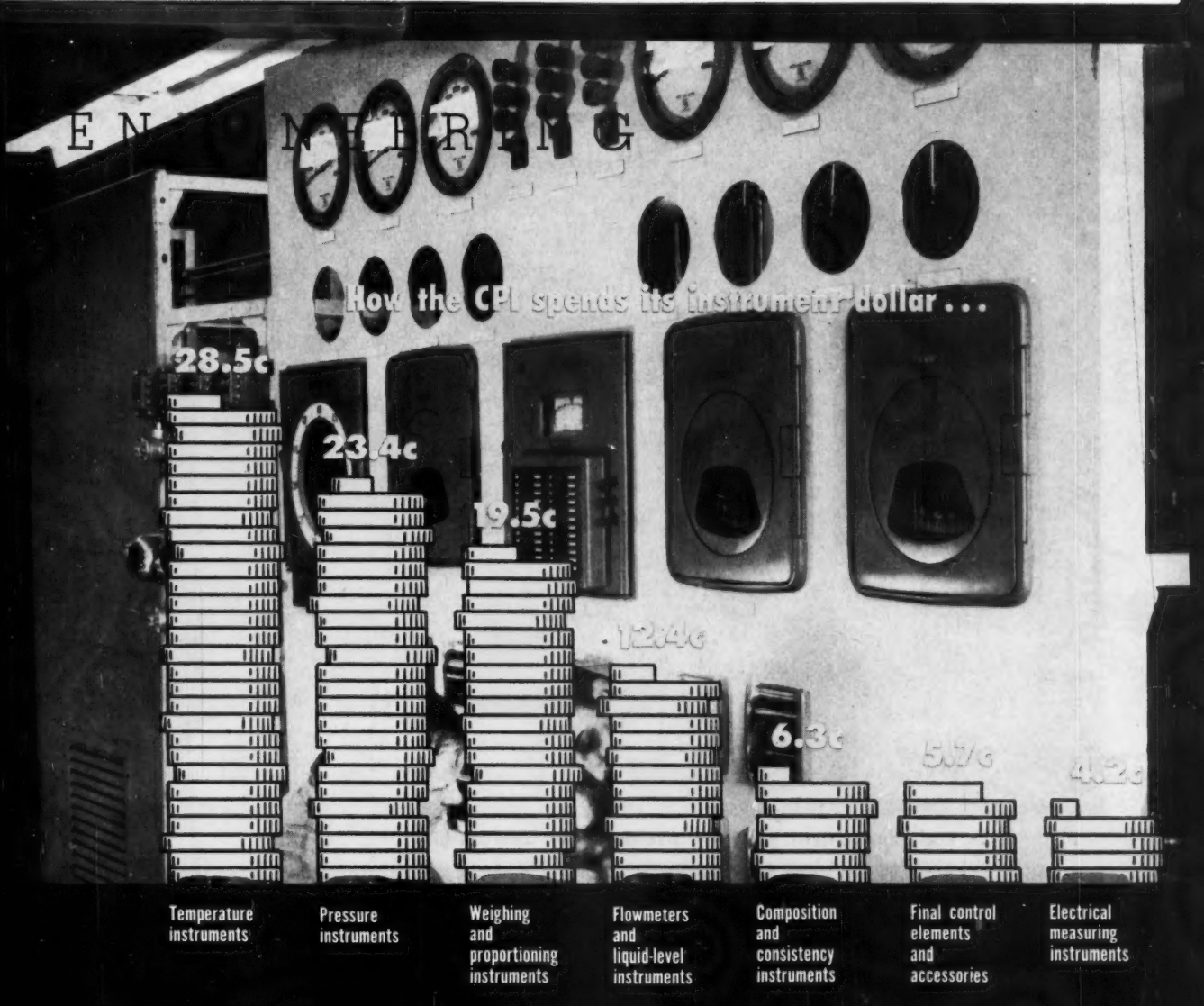
KANKAKEE, ILLINOIS

General Mills

SALES OFFICES: New York, Boston, Philadelphia, Charlotte, Chicago, Kankakee, Houston, Los Angeles, San Francisco

Versamid Polyamide Resins • Genamid Liquid Epoxy Curing Agents • Fatty Nitrogen Chemicals
Deriphat Amphoteric Surfactants • Sterols

Aliquat, Versamid, Genamid, Deriphat are trademarks of General Mills



Insure Your Instrument Investment

Modernize your instrument planning to reap profits while avoiding pitfalls. Here's how to do it.

Process-plant automation isn't new, but it's news. Look at some highly revealing figures Du Pont has just disclosed. It points out that "company-wide, up to 10% of plant investment is tied directly to instrumentation. This is at least twice the percentage of 25 years ago." It also says, "In 1950, Du Pont had about $60 million invested in instruments; today, it tops $100 million."

This experience is typical of the process industries. And that's why management men are increasingly concerned with spending their companies' instrument dollars where they'll do the most good. There are profits to be made, of course—and there are also pitfalls.

Automate for a Purpose: In most companies, to the man who decides on money matters, the important questions is: Will this investment meet our payout criteria or won't it? Few, to be sure, want an automatic plant just for the sake of automation. Many economists and demographers, however, as well as process-control engineers, believe that increased productivity required of the nation's economy for future growth can come only from increased reliance on automatic operations. An attitude that blocks acceptance of new ways of doing things or thinking about things, they insist, could slow a company's productivity to a rate below average —a situation that would not sit well with shareholders or potential shareholders. How then can controls be justified, and what are the rewards?

Communication: A leading instru-

'Instrumentation starts at project's inception.'

PLANNING: Early instrument planning avoids costly overdesign.

ment engineer of a large processing company states a basic difficulty of justifying instrumentation when he says: "The accountant and the instrument engineer don't speak each other's language." This instrument specialist feels that each has to learn the other's viewpoint, implies that it's the accountant who has the most to learn. The semantic barrier? The accountant doesn't understand dynamic interactions in a process, tends to be too narrow in his definition of controls.

Other factors block acceptance of control-system proposals. John Kneiling, a professional engineer with the consulting firm of T. J. Kauffeld Associates, cites large-company specialization: "The specialization makes it impossible for the company's designers to see where applications will save their company the largest amounts of money." Kneiling feels that the consultant is in an excellent position to assist a company on automation projects, for two reasons: (1) he is a disinterested party to whatever changes must be made, and (2) his prime concern is to offer to his clients—from his experience with many companies and industries—the best and cheapest system.

An instrument engineer of one large processing company that spends heavily on control systems feels there's no reason to consider control systems differently from any other equipment. However, there is, in fact, a "psychological" block whereby the decision-makers demand a 100-200% annual return for instrumentation, compared with 10-20% return for standard plant expenditure.

These are only a few of the more formidable problems. But the incentive to overcome them is high. Jack Johnston, head of instrumentation in Du Pont's engineering department, cites a pH system installed on a nylon waste-recovery operation. Cost of the instrumentation, installed, was about $5,000; the investment showed a return of $50,000 in the first year. And although the return cannot always be expected to be so high, many chemical firms have had similar experience.

Leading from Strength: Where tangible benefiits are seen, the economics are easiest. An improvement in product quality would save costs of reprocessing or dumping off-specification material. Vince Riggio, instrument project engineer at U.S. Industrial Chemicals Co., cites his company's experience with chromatographic stream analysis: "We tried it on a fractionating column. It cost about $15,000, installed, but has improved product quality from the previous 93% to the present 98%. This boost in quality was sufficient to pay out in a couple of months. But to improve from 98% to, say, 99% would just not pay off." Pleased with this result, USI is installing chromatographic stream analyzers on reactors at its new polyethylene plant at Houston, Tex.

General Chemical found that instrumentation brought about considerable savings in the modernization of the traditional sulfuric acid line in its Marcus Hook, Pa., plant. In this case, the 98%-acid line was delivering below specs in some cases and above in others. Result: customers took the gravy when higher-acid content was delivered, asked for rebate when content was lower. In either case, the company lost money. With the control instrumentation, the 98% acid is delivered round-the-clock; at the same time, economies have been introduced in intermediate processing stages. Now, the shift foreman at General Chemical's sulfuric acid plant knows the 98% stream is delivering on-spec acid all the time in a process that—except for controls—is several generations old.

Variations of these two incidents are occurring daily in some plants throughout the CPI. Their common link: an engineer justified to the financial decision-makers of his company the expenditure of capital funds for control systems.

Justification is sometimes forced by external matters over which the manager has no control. Bob Davis, of instrument manufacturer Leeds & Northrup's analysis instrumentation section, cites legal action as one example. In many areas, there are municipal or state pollution laws requiring pH control of effluent streams. Larger companies, Du Pont for one, usually insist upon compli-

in only 8 months at 10 per cent under budget

10% UNDER BUDGET—Pennsalt Chemicals Corporation's new Methylamines plant was completed by Catalytic, Engineers—Constructors, at a figure ten per cent under the original estimated cost.

AHEAD OF SCHEDULE—The Methylamines plant was completed and ready for start-up in only eight months after the start of engineering. This "On-Time" completion was in advance of the requirements of Pennsalt Chemicals Corporation.

UNDIVIDED RESPONSIBILITY—Catalytic's control and coordination of all phases of this project and close cooperation with the client were prime factors in the successful completion. This Methylamines plant again proved Catalytic's ability to render all client services "On-Time, On-Budget".

CATALYTIC
CONSTRUCTION COMPANY

Philadelphia 2, Pa.
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In Canada: Catalytic Construction of Canada, Limited; Sarnia, Ontario; Toronto, Ontario; Montreal, Quebec.

Catalytic *On-Time . . . On-Budget* Services for the metallurgical, chemical, petrochemical and oil refining industries: Project Analysis; Process Development; Process Design; Economic Studies; Engineering; Procurement; Construction.

'Coordinate instrumentation with process design.'

TRAINING: Future engineers must be trained in systems concept.

ance with local pollution requirements at the design level, but many smaller firms do not act until they're forced.

There are other cases where justification of control systems is relatively simple, although the economics are not so straightforward. Vitro Engineering's chief process engineer, Joseph Koslov, had to consider the operators' safety when he prepared a proposal for a fuel-reprocessing plant to be operated in conjunction with one of the abuilding nuclear fuel central power stations. The high, continuous level of radioactivity made automatic operation essential. Leeds & Northrup's Davis cites similar safety considerations in the phthalic-from-naphthalene oxidation route that requires, for optimum results, operating near explosive limits. Instrumentation is the only guarantee of safety in such a case.

Need for 'Systems' Concept: It's not just the accountant who misunderstands how control systems work. The head of one large chemical firm's instrument group says the systems concept must be sold to project engineers whose training and experience are largely in chemical engineering. "In a typical project," says this instrument man, "the engineer knows that some instruments may be needed to run the plant he's designing, but he doesn't believe in a system approach. The instrument engineer is usually not called in until the flow sheet is pretty well settled. Only one out of four project engineers is sold on our method."

And what is that method? "Our main goal is to be in at the inception of a project—at the time the dynamics of the process should be considered," he explains. Many instrument engineers feel that design engineers of the future, perhaps in a matter of 10 years or less, will have to be control-system experts.

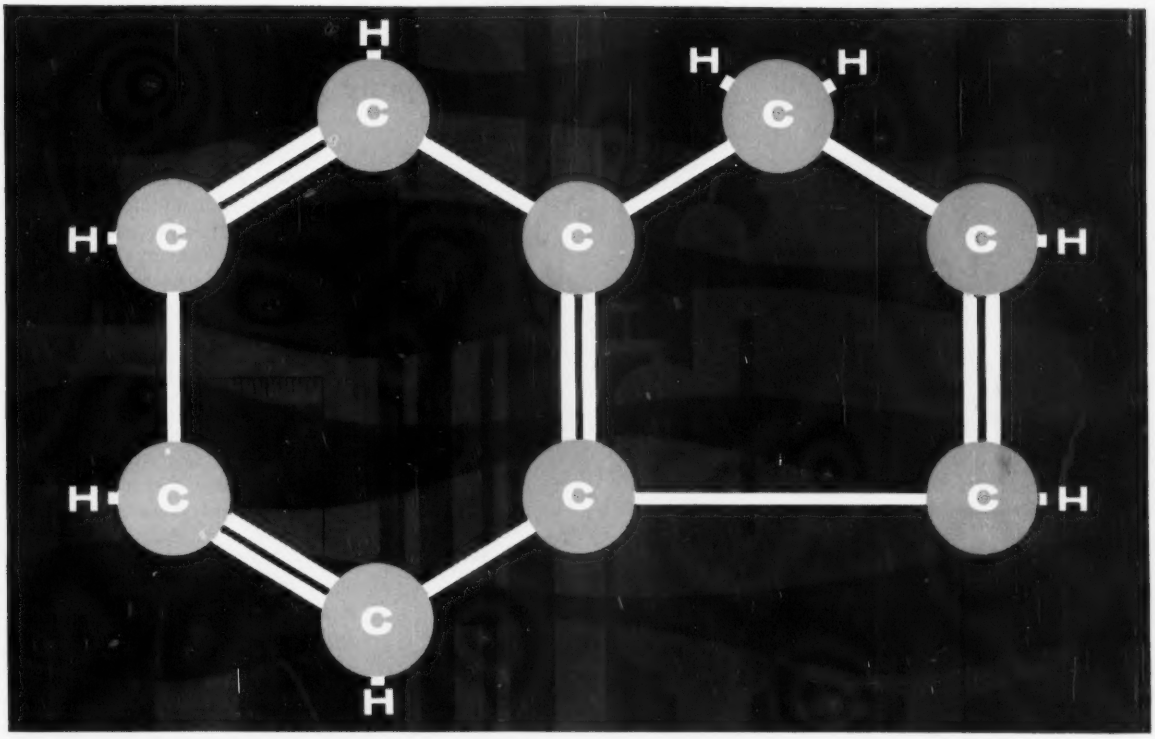
Phil Flemming, of Du Pont's instrument design staff, says that at the design level, the most advanced ideas cannot be used. "We have to give the design engineer a system that we know will work. There are other people in the company (for example, Jack Johnston and his group) who can evaluate and recommend new instrument systems." The problem that might arise if the designers were given their head is that a new instrument system might fail. When this happens, instrumentation as a whole receives the blame. Du Pont's Tom Vick Roy and Johnston agree that one failure upsets the applecart for many potential new applications.

On the other hand, a success in a new system, regardless of how it was originally sold to management, paves the way for other applications. "There's nothing like a success story," says L & N's Davis, "to help us sell more instruments."

The "crash" nature of many proposed plants also seems to come in for a share of criticism. The systems approach to design requires a close coordination of instrument men and process designers. When time is of the essence, many fundamental problems are overlooked or skirted in order to get the plant onstream as soon as possible. The result of this is often that either the plant is overdesigned—meaning unnecessary investment dollars—or it won't run properly.

Instruments are also often suggested as a means of modernizing existing plant without spending too many dollars. True or not, management men responsible for investment decisions often turn down the proposals for instrumentation. Why? Vick Roy puts his finger on one reason: "When you're looking at a modernization proposal, it may be harder to justify the instrumentation because it's probably a much larger percentage of the cost package than it would be in a normal new plant. In the latter case, you can be further off in your estimate and still get the payout."

Vitro's chief instrument engineer, Frank Shafran, seconds that, says: "On one $6-million job in which instrumentation was rather widely defined (for example: all equipment not operated under 60-cycle power), $5 million was for instrumentation." And Bob Davis adds that management often looks harder at the modernization proposal because the existing line is already working without instruments; thus, they discount



Neville Announces Production of HIGH PURITY INDENE

Neville is now in semi-commercial production of high-purity indene. It is a mobile, almost water-white, high boiling liquid, similar in appearance to monomeric styrene. The big potential interest in this new chemical lies in the fact that it has two reactive centers—the double bond and the methylene group—both in the five-membered ring fused to the benzene nucleus. Indene will polymerize or react to form a wide range of useful intermediates. Potential uses are indicated in the fields of polyesters, synthetic rubbers, copolymers, insecticides and repellants, drugs, dyes, plasticizers, antioxidants, surface active agents and synthesis of steroids and vitamins. Use your letterhead or the coupon below to write for a bulletin and sample.

Typical Inspection

Purity, % by Wt.	97.5
Freezing Point, °C.	—3.5
Specific Gravity 60/60°F.	1.0002
Refractive Index (n^{25}/D)	1.5726
Distillation Range (IBP-EP), °C.	180.0-186.0
Flash Point, °F.	173
Color (Saybolt)	+21 (inhibited)

Neville Chemical Company • Pittsburgh 25, Pa.

NEVILLE

- ☐ Please send bulletin on indene.
- ☐ Please send free ¼ lb. sample.
- ☐ Please send price schedule on larger quantities.

NAME TITLE

COMPANY

ADDRESS

CITY STATE

NC-36-CW

'Go outside the company for advice, new ideas.'

CONSULTATION: Instrument makers and consultants can help.

the inevitable optimizing effects of a well-planned controls system.

The Way Out: Although it's obvious that roadblocks lie in the pathway of complete acceptance of instrument control systems, instrument men seem optimistic about the future. The consensus is that, although it may be hard to sell an original system, the next one comes easier; and after several successes, a pattern is established that everyone from project engineer to financial vice-president takes for granted.

Then, there are those new instruments that are justified as research expenditure. At U.S. Industrial Chemicals, such instruments are not required to meet the normal plant payout, but they are paid for out of research funds. It is clearly understood at the time a project is approved that their purpose is research. Says another firm's instrument man: "This is true in our case, too; but often after we've presented our case to an operating manager, he's more than happy to pay for the equipment."

Du Pont, however, pays for the research instrumentation on a plant line with plant capital. Vick Roy explains it this way: "We wouldn't try research instrumentation on a line unless the payout for the whole plant were very favorable. That leaves a big margin for mistakes. There are likely to be four or five reasons for which the instruments should pay out, any two of which, if successful, will pay out."

It's in the fringe area—the instruments that are "nice" to have—where the biggest problems arise. Du Pont's scheme of playing the percentages is one answer. Another is examination of the problems from outside. Kneiling, in speaking of the consultant's role, says, "We can't bother with refinements; it's hard enough to sell people on projects that will save them lots of money." Still, the fact that a company has called in an outsider implies that it's willing to find room for improvement.

Education is another reason why control engineers are optimistic. Universities are offering more training in control. But in most cases, the electrical and mechanical engineering curricula have led the way, with chemical engineering departments just beginning to show interest. As for "on the job" education, says Jack Johnston: "We get some of our most advanced designs from engineers who have been 'converted' to our reasoning. And these same engineers initiate others in their departments into the systems approach." Adds Tom Vick Roy: "Our own control engineers—the ones best qualified in process problems—pass on chemical engineering thinking to their colleagues."

Vows one instrument man: "When the younger generation of systems-conscious men climb into higher areas of responsibility in management, we'll have reached our main goal." But it's the companies whose managements first recognize the profit-making potential of systematic control application that will be ahead in the competitive rush.

The Competitive Dilemma: Strangely enough, the role of the instrument manufacturers is an ambivalent one — one that comes in for both blame and praise. These companies maintain large engineering staffs, experts in various processing fields as well as in instrumentation. A large part of their work on a project involves consulting service. At the same time, the companies have a vested interest in selling their instrument systems to the same people to whom they offer the consulting service. Says one processing company's instrument man: "The user may be sold a bill of goods on elaborate instruments that may not function properly." Counters another: "If you know the right man to talk to, you can get a lot of help from the instrument manufacturer. But it's hard to find the right man, and the field representatives often do no more than quote from their catalogs. That we can do ourselves."

But, claims one manufacturer: "We're very careful about our consulting service. If we weren't, it would come back at us in the long run. We do know our equipment best, of course; so we like to examine at the start whether we should be in on a job. The whole trouble is that if we don't give this service, our competitors will. We can't charge for the service unless we actually land a job —and we don't always land 'em."

And some processing men's experience backs this up. Says Vitro's Frank Shafran: "One manufacturer's man gave us some fabulous advice for our Salt Lake City uranium mill—stuff we wouldn't have thought of ourselves."

The processing companies aren't faultless in the relations between the instrument makers and themselves. An engineer of one large Eastern firm says: "We know that our instrument

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Design in three dimensions

At Fluor's Los Angeles headquarters, there is an 8,000-square-foot building where 30 plant designers work with 20 professional modelmakers. Drafting tables are within 10 feet of model assembly tables. Another building contains an elaborate photographic studio where precisely scaled isometric and plan views can be taken under shadowless lighting.

All this began seven years ago when Fluor engineers built a scale model and rigged miniature hoists to solve a difficult erection problem. Success of this trial led to experiments with the use of models as a basic design tool. Cost studies showed substantial savings in drafting man-hours (net savings, above modelmaking costs.)

Today, models are to be found in most of Fluor's drafting rooms, and nearly all Fluor-built plants are designed with the aid of this tool. Beyond the dollar savings there are many less tangible benefits. Sizable groups can confer over a model, reach quick agreement on layouts, approve or revise many details at a single session.

Piping runs are shorter and more direct, valves and instruments are more accessible when designers lay them out on a model (a Fluor comparison study of a refinery design showed a $50,000 saving in pipe, fittings and fabrication by use of a model vs. conventional layout drawings.)

Costly revisions are minimized when many specialists can study a complete plant in miniature before construction begins. In the field, models serve as a reference for construction crews and a guide for operator training.

Unless scale models are properly used—as a basic, integrated design tool—most of these advantages are lost. The development and refinement by Fluor of design techniques using scale models has been a creative contribution to the engineering and construction industry.

For more information on the use of scale models in design and construction, write to Dept. 32, The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California.

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group saves the company money by designing and specifying for our needs. But we don't go outside the company for advice as often as we should." No one has a monopoly on technical know-how, even if they're leaders in a particular field.

Weighing Intangibles: There are many cases where the intangible advantages of instrumentation are difficult to assess because there is no single outstanding process improvement. In examining the manufacture of Freon, Du Pont engineers found that the product carried 3-ppm. moisture. By instrumenting the line, moisture can be reduced to 1½ ppm. Although the purer product commands no premium in the marketplace, it's easy to see the psychological advantage to Du Pont salesmen when they quote to a purchasing agent a lower moisture content, especially when winter freeze-ups are uppermost in mind.

Often management's first thought with respect to an automation project is that it will reduce labor costs. Not necessarily so, says Vitro's Koslov. "One heavy-chemicals plant we know of—where output is captive—didn't instrument because it takes a certain minimum amount of manpower each shift, instruments or no."

Others' experiences seem to verify that control engineers shouldn't use too much time looking for savings in labor, direct or indirect, or in overhead such as research and development, administration and taxes. Generally, instrument systems are most effective for controlling interdependent processing variables, finding the optimum use of energy and materials to get the end-product. Lee Coleman, of Leeds & Northrup's heavy industries instrumentation section will tell you that combustion control on an open-hearth furnace will minimize secondary burning, lessen refractory spalling, save fuel and furnace materials. Most spectacular return on investment in control instrumentation comes from such optimization cases as this and the others cited above.

Why Resist Progress? Despite all, a certain amount of inertia still exists throughout industry for rationally considering the adoption of automatic controls in process lines. The reasons may be categorized under two general headings: administration problems and instrument industry structure.

The administrative problems arise as a natural part of the present state of an industry. In some industries (e.g., steel, cement, and paper and pulp), the state of the art is such as to make it technologically improbable that instruments will be applied systematically. In general, controls used in these industries are added after the plant flow is determined and, indeed, after the equipment has been purchased and installed. (It should be noted, however, that this is a relative proposition. Progress is slowly being made in all three industries.)

Other administrative problems include those of maintenance. Says one instrument man: "In one of our plants, one-third of the instrumentation is not working now. With winter freeze-ups, two-thirds will malfunction. Maintenance is the big problem, getting and keeping the right kind of man to service the control systems." Although in this particular company this failure due to improper maintenance has not seemed to hinder investment in instruments, it is easy to understand why such problems could.

It's Up to Management: These comments add up to one certainty: decisions to spend capital funds for instrumentation—especially on modernization efforts—cannot be put off. For the rush of technology—that sees each plant erected virtually a completely new one—brings reward to those who produce the most, cheapest, fastest and best.

Wrought Rhenium

New processing advances make possible this week the first commercial offering of fabricated forms of rhenium. Chase Brass & Copper Co.'s research and development department (Waterbury, Conn.) worked out processes for fabrication of the wrought metal, which it's now offering in rod, wire and strip form.

Rhenium has been the subject of research for several years (*CW, April 7, '56, p. 115*), but to date has been available only in powder form.

Chase—which developed the process in conjunction with parent firm Kennecott Copper's research center at Salt Lake City — stresses the unusual properties of rhenium in painting the metal's future. Its 3180 C melting point puts it below only carbon and tungsten in the high-tem-

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perature scale. And it's said to have good oxidation resistance up to 600 C. Some practical applications: thermocouples (with tungsten), enabling measurement and control up to 2500 C; welding material for molybdenum; alloys with molybdenum; electrical contacts, providing (in certain applications) life expectancy 20 times that of current materials; improved filaments and structural components for electronic tubes, ion gauges and mass spectrographs.

The method used by Chase involves hydrogen reduction of the ammonium perrhenate recovered in extracting molybdenum from copper ore. The rhenium powder obtained is compacted at pressures of 25,000-30,000 psi. and then presintered for two hours at 1200 C and 0.5-1-micron pressure. A final sintering operation is carried out in hydrogen atmosphere at 2800 C until the bar reaches 90-96% of theoretical density. Fabrication of the bar into shapes is done by cold-working, which requires frequent annealing.

Chase's capacity for wrought forms or rhenium is admittedly not large (initial capacity is about 100 lbs./year), but uses for the metal are still in the experimental stage. And its properties steer it toward small-quantity special applications.

But the company does observe that rhenium production is expected to grow from its current rate of under 1,000 lbs./year toward an estimated potential of 20,000-30,000 lbs./year. Typical current prices: $680/lb. for powder, $780/lb. for bar, $2,125/-lb. for strip, 55¢/ft. for 3-mil wire. Previously, the powder was available from Kennecott and U. of Tennessee, and wrought products for internal use had been made by General Electric and Battelle Memorial Institute.

Anthraquinone Route

American Cyanamid this week disclosed some of the key steps of the new anthraquinone process it will use in the expanded facilities now being built at Bound Brook, N.J. (CW Technology Newsletter, Feb. 14).

The new route — a direct oxidation of naphthalene in a fixed-bed catalytic converter — involves the separation of the naphthoquinone produced by the oxidation reaction, followed by a Diels-Alder condensation with butadiene to yield anthraquinone.

Most naphthalene oxidation processes are designed to suppress naphthoquinone formation, to shift the product balance in favor of phthalic anhydride. Cyanamid will reverse this practice by selecting catalysts and operating conditions that favor maximum yields of naphthoquinone.

The naphthoquinone product mixture from the abuilding oxidation plant will contain more than 50% phthalic anhydride and unreacted naphthalene. Separation of the three in an absorption-extraction system will recover naphthalene for recycle, phthalic anhydride for sale as a valuable by-product, and naphthoquinone for these alternative end-uses:

- It can react with butadiene to make anthraquinone.
- It can react with several other materials (e.g., isoprene) to make substituted anthraquinones (e.g., methylanthraquinone).
- Or, it can be sold directly.

The new anthraquinone facility will enable Cyanamid to double its capacity for the product, even while dropping its present operation for making the material from phthalic anhydride and benzene. Marketing naphthoquinone reportedly would make Cyanamid the only commercial producer in this country.

National Aniline previously sold naphthoquinone, but now uses it all captively. Other producers have sold small quantities recovered as unsought by-product of phthalic anhydride production. But, to date, imports have supplied the bulk of the growing market for naphthoquinone in a variety of applications such as photographic chemicals, plastics, pharmaceuticals, fungicides and algaecides.

Since domestic producers are reluctant to quote capacity figures, Cyanamid's best guess of the total U.S. production of anthraquinone is about 4-5 million lbs./year (based on production figures for *o*-benzoylbenzoic acid — the intermediate in the manufacture of anthraquinone from phthalic anhydride and benzene). This estimate doesn't include the unreported production of anthraquinone via the anthracene air-oxidation process employed by Toms River - Cincinnati Chemical Corp. (Toms River, N.J.).

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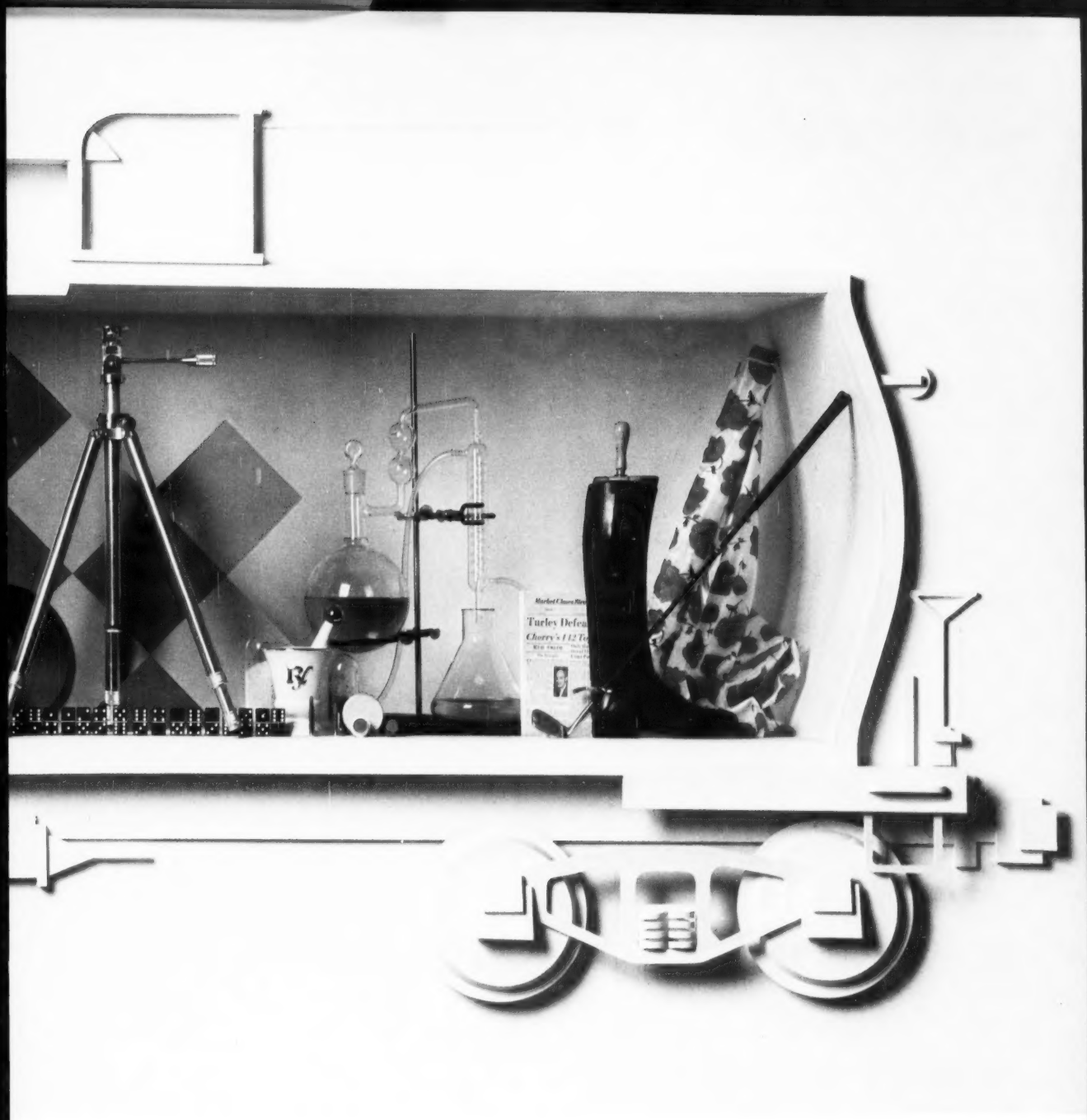

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a note on operating economy—

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Princeton
Where the Natives are Friendly to Research

Nassau Street at noon points up unhurried university town climate, even in business section.

SHOPKEEPERS on Nassau Street, main stem of Princeton, N. J., are getting acquainted with some new customers this week. The newcomers, researchers and their families who will settle at various points in Mercer County (of which Princeton is the scientific hub), signal the approaching occupancy of Columbian Carbon's new, million-dollar research headquarters, located not far from the university town.

Almost all of Columbian's senior staffers will relocate in the new area when the shift from the firm's present research facilities in Brooklyn, N.Y., is complete. Chances are that, like the hundreds of other researchers who have flocked to the area in recent years, they'll find the new surroundings much to their liking.

About 50 (*see table p. 77*) industrial research organizations now operate in Mercer County, many close to Princeton itself. The reasons for this large—and growing—complex bear scrutiny by firms planning to build a new lab. A verdant patch in the industrial belt stretching from Boston to Washington, 228-sq.-mile

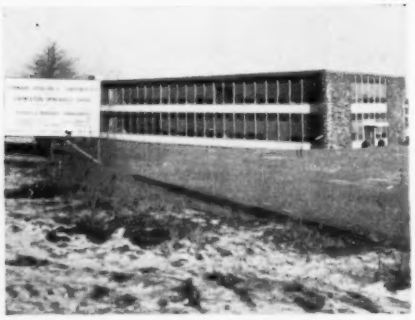
New settlers swell the laboratory colony

RCA's Research Center

American Cyanamid

Columbian Carbon

McLean Engineering



Opinion Research

Firmenich Inc.

Princeton University Plastics Laboratory

James Forrestal Research Center

Electronics Research

Site for American Cyanamid's planned agricultural experiment station is field near town.

Food Machinery and Chemical

Textile Research Institute

Roger Williams Tech. & Econ. Services

Research in Mercer County, New Jersey

Company	*Activity*
AeroChem Research Laboratories, Inc.	space propulsion
Aeronautical Research Assoc. of Princeton	aerodynamics
Ajax Engineering Corp.	induction furnaces
American Biltrite Rubber Co.	vinyl and rubber flooring
American Cyanamid Co.	farm chemicals (planned)
Applied Science Corp. of Princeton	telemetering systems
Baldwin-Hill Co.	insulating materials
Beva Laboratory	nuclear instrumentation
Albert E. Blomquist and Associates	transportation engineering
G. F. Bush Associates	scientific instruments
Cities Service's Research and Development	petroleum products
Columbian Carbon Co.	carbon black and pigments
Curtiss-Wright Corp.	instrumentation
Daystrom, Inc.	electronics (planned)
De Laval Steam Turbine Co.	steam and gas turbines
Electric Storage Battery Co.	rubber, plastics, etc.
Electronics Associates Inc.	computer calculations
Fatigue of Materials Laboratory	fatigue and corrosion
Firmenich, Inc.	flavors
Food Machinery and Chemical Corp.	chemicals
General Development Corp.	special machinery
General Devices, Inc.	electronics, electro-mechanics
Goodall Rubber Co.	elastomers and plastics
Hamner Electronics Co.	electronic equipment
Heinemann Electric Co.	circuit breakers, etc.
Homasote Co.	insulation board, plastics
Hydrocarbon Research Inc.	petroleum refining, etc.
Industrial Reactor Laboratories, Inc.	nuclear research
Kaye-Tex Manufacturing Corp.	plastic film and sheeting
Kramer Trenton Co.	refrigeration
McLean Engineering Laboratories	electronic-equipment cooling
National Automotive Fibres, Inc.	foam rubber products
Power Generators, Inc.	jet-engine starters, etc.
Princeton Laboratories, Inc.	drugs
Princeton Paint Laboratories	protective coatings
Productive Design and Research Corp.	tool design
Radio Corp. of America	electronics, etc.
John A. Roebling's Sons Corp.	steel and copper wire, etc.
Socony Mobil Oil Co.	petroleum products
St. Regis Paper Co., Panelyte Division	laminated plastics
Switlik Parachute Co.	parachutes
Textile Research Institute	textiles
Thermoid Co.	rubber products
Thiokol Chemical Corp.	polymers, etc.
Tile Council of America, Inc.	tile and installation
United Clay Mines Corp.	clay applications
U.S. Naval Air Turbine Test Station	aircraft engines, etc.
Vulcanized Rubber and Plastics Co.	high polymers
Western Electric Co.	semiconductors (planned)
Winner Manufacturing Co.	glass-reinforced plastics
Young Development Laboratories, Inc., Division of Hercules Powder Co.	glass-reinforced plastics

Mercer County still contains sufficient available land to comfortably double or triple the existing concentration of laboratories within its borders.

That's lure enough for some firms whose labs are cramped in overcrowded metropolitan buildings. Columbian, for example, found its Brooklyn facilities too tight for comfort, built the new lab on a 14-acre plot that provides for any foreseeable expansion. The two new buildings total 30,000 sq. ft. of floor space.

Proximity to both Philadelphia and New York is another lure. Carl Sweitzer, Columbian's research direc-

BUILDER AND LANDOWNER WORK TOGETHER to bring research to Princeton. Cooperation between contractor Raymond Bowers and property holder Henry Jeffers epitomizes town's desire to attract new labs.

Giving support to industry's experts

ENGINEERING PROFESSOR E. Johnson and . . .

GEOLOGY PROFESSOR J. C. Maxwell (right) counsel industrial-scientist neighbors on fundamental-research problems. University is font of basic knowledge in variety of disciplines.

ASCOP LIBRARIAN Kathryn Lyon likes local libraries' book-sharing plan—source of community pride.

CHEMICAL CONSULTANT Roger Williams (center) specializes in market research studies.

SPIRES OF UNIVERSITY symbolize town's scientific, cultural resources, lure for researchers and families.

tor, explains that this was important because his firm's headquarters are in New York, and it also has research and development activities in Philadelphia and Trenton, N.J. Other R&D is done at Monroe, La., and the company has 16 carbon-black plants in Louisiana, Texas, Arkansas, Kansas and New Mexico, as well as jointly owned plants abroad.

Understandably, a number of locations for the new lab were weighed carefully. But all except Princeton were scratched — they were too isolated from the bulk of the company's customers and the heavy concentration of academic and other scientific facilities in the East.

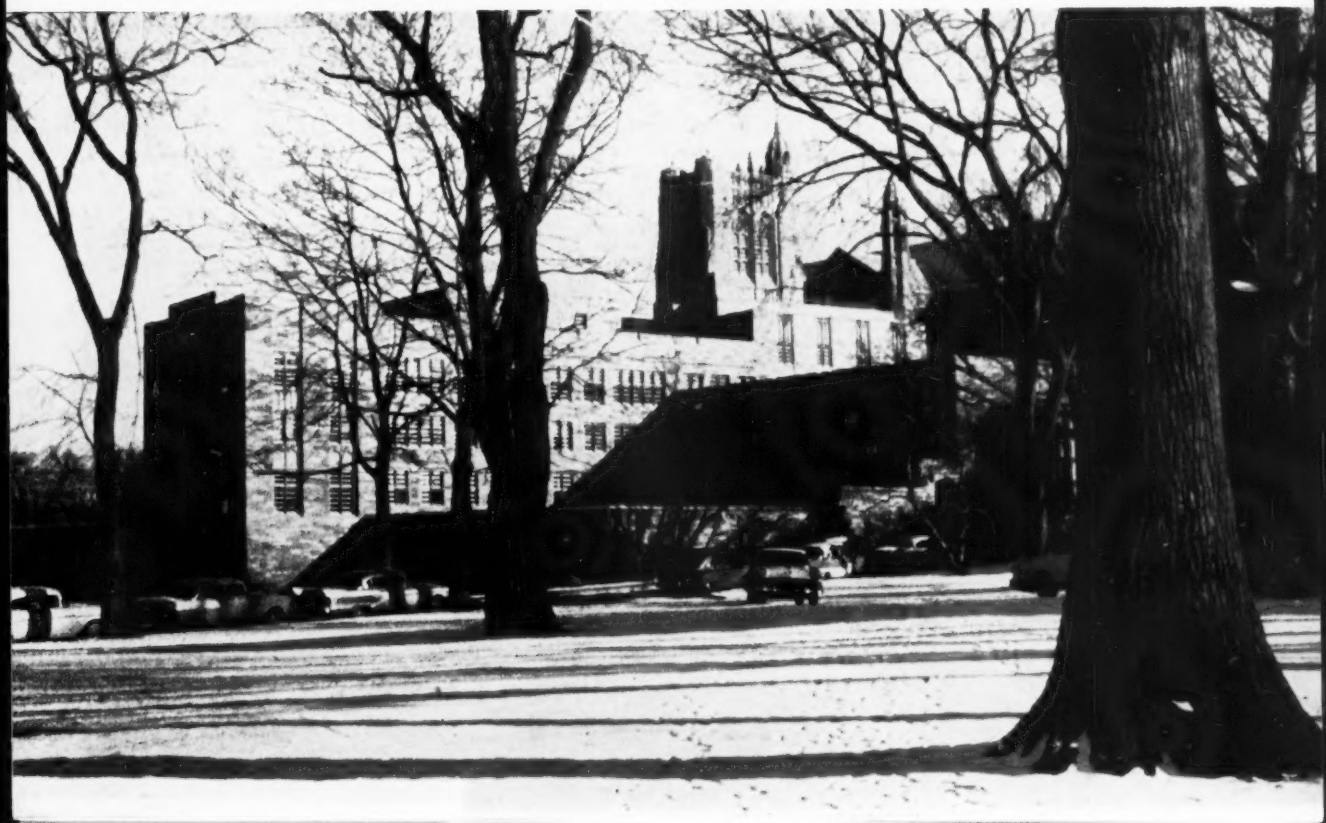
Strategic location and available land are themes constantly repeated by Princeton townspeople eager to attract more industrial research. Their eagerness, in fact, is an inducement to prospective settlers.

Princeton has traditionally resisted

AUTOMATED LIBRARY at FMC uses IBM equipment for searches of vast, and burgeoning, chemical literature.

ASCOP LIBRARY is stocked with broad collection of electronics texts—and technical reports in this field.

FIRESTONE LIBRARY is huge, contains 1.4 million bound volumes, thousands of pamphlets, manuscripts.



The town takes care of its own

HOUSING runs gamut of medium and expensive range. Development models (left) sell for $20,000; executive's home (right) is valued at $50,000.

HIGH SCHOOL is one of town's three public schools for area's children. Hospital (right) contains 141 beds, 20 bassinets, ample for area's needs.

inroads by industry, preferring to preserve the unique pastoral, academic atmosphere it has maintained since Princeton University (founded at Elizabeth, N.J., in 1746) moved to its present site in 1757. As a result, manufacturing activities having attached research laboratories are relatively scarce. Princetonians view separate research organizations in a different light. These activities don't detract from the bucolic environment but do bring in high-salaried professionals, who contribute heavily to Princeton's civic and economic standards. Item: buying income of Mercer County's 70,000 families is nearly $8,000/-family. Princeton, with a buying income of over $15,000/family, leads New Jersey and ranks among the top 10 communities in the nation.

Mercer County residents who are actively seeking new labs for neighbors include Henry Jeffers, Jr., president of Walker-Gordon Laboratory Co. (Plainsboro, N.J.), and Raymond Bowers, president of builders Lewis C. Bowers & Sons, Inc. Land for the Columbian laboratory, for example, was sold by Jeffers, and the lab was built by Bowers. Both have also figured in the decision of other firms to bring research facilities within

Looking at the future, Bowers and Jeffers discuss project for converting dairy land into lab site.

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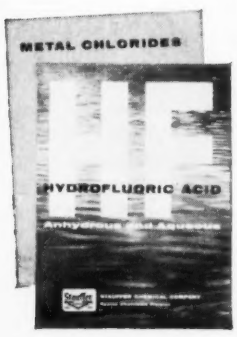

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reach of the Princeton campus.

Jeffers also sold the 37-acre tract for Food Machinery and Chemical Corp.'s central research laboratory, built in 1956. His long-range goal is a balance between new lab construction and residential construction.

As a relatively settled resident of the Princeton area, FMC lab manager S. D. Marcus has had an opportunity to form opinions on the advantages of the new location. While Marcus likes the easy communication with FMC's New York main offices and the abundant space available for lab work, he points out that there are other benefits for lab staffers. Princeton Township schools are considered among the finest in the East, Marcus feels, possibly because of the abundance of scholars on the school board and in the Parent-Teachers Assn. In addition, the Princeton Area Science Education Committee (*CW, Jan 31, p. 78*), an organization of industrialists, has state-wide influence on science teaching.

Good medical facilities are also available, not only in nearby cities but also in Princeton Hospital, reputedly one of the best of its size.

A point of pride with Princetonians is the area's system for mutual exchange of library books. This links the huge Princeton University library (1.4 million bound volumes) with a maze of industrial libraries. Libraries of each of the research facilities are open to the others. Mrs. Kathryn Lyon, head of the technical information section of Applied Science Corp. of Princeton, explains that it may be up to the borrower to do some individual searching if the required material takes time to ferret out. But in general, cooperation among the libraries is good. Mrs. Lyon is treasurer of the Princeton Area Librarians, which meets four times a year. Most members also belong to the Special Libraries Assn., a national group.

Professional researchers find Princeton University's nucleus of experts in a variety of fields added stimulus for working near the campus. Opportunity for interchange of ideas with faculty members is highly valued. However, the university maintains a neutral stand on the advisability of faculty members' doing consultant work.

Companies looking over the Princeton area for possible new lab sites won't find it completely devoid of snags, despite the generally good outlook. For one thing, housing for lower-rank researchers is hard to come by. Houses in Princeton cost from $30,000 to $75,000. Junior staffers may thus have to settle in the outer reaches of Mercer County, where $13-20,000 housing is available. Moreover, the favorable atmosphere toward new labs may not persist indefinitely if, for example, the competition for clerical help becomes acute.

Still, if you're planning to build a new lab, don't overlook Mercer County. The natives are friendly—and that's half the battle.

EXPANSION

• Tracerlab Inc. (Waltham, Mass.) has dedicated its new, $40,000 Reactor Monitoring Center at Richmond, Calif. The lab will be used exclusively for testing radioactivity of flora, fauna and minerals, under AEC auspices.

• The Federation of Spectroscopic Societies, dissolved late last year, has reorganized as the Society for Applied Spectroscopy, hopes for 2,000 members this year. President-elect is Mrs. Sarah Degenkolb, United States Steel Corp. (Cleveland).

• Shell Development Co. (Emeryville, Calif.) has set up new departments for synthetic rubber and thermoplastics research.

• Esso Research and Engineering Co. (New York) has organized a new unit of scientists to handle a $1,264,000 Army Ordnance research contract on solid propellents.

• Owens-Illinois Glass Co. (Toledo, O.) has established a section in the General Research Dept. to handle metallurgical research and services for the entire company.

PRODUCTS

Emotion Controller: Wyeth Laboratories (Philadelphia) is out with Prozine, a psychotropic agent useful in treating severe emotional disturbances. It's intended chiefly for use in overly apprehensive medical patients, and patients who receive no relief from barbiturates and other analgesics.

•

Urethane Polyester: Pleogen 4002, a polyester developed by the Moly-

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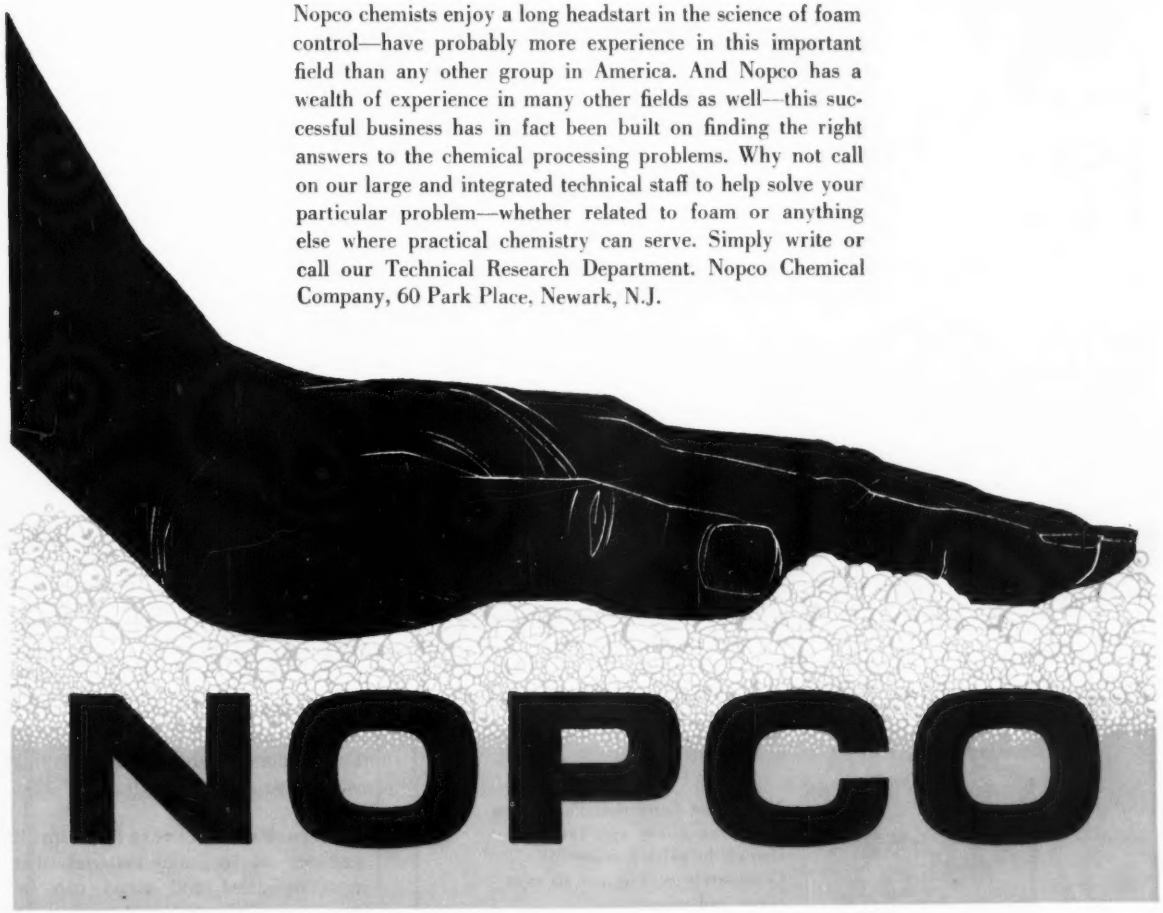
. . . IN ADHESIVES *to make possible the mechanized application of glue in large amounts*

. . . IN ANY PRODUCT *where foam would otherwise be a problem*

Nopco chemists enjoy a long headstart in the science of foam control—have probably more experience in this important field than any other group in America. And Nopco has a wealth of experience in many other fields as well—this successful business has in fact been built on finding the right answers to the chemical processing problems. Why not call on our large and integrated technical staff to help solve your particular problem—whether related to foam or anything else where practical chemistry can serve. Simply write or call our Technical Research Department. Nopco Chemical Company, 60 Park Place, Newark, N.J.



NOPCO® VITAL INGREDIENTS FOR VITAL INDUSTRIES

Lubricants • Detergents • Sizes • Plasticizers
Softeners • Emulsifiers • Dispersing Agents
Wetting Agents • Defoamers • Thickeners

For complete information, see Chemical Materials Catalog, page 378

HARRISON, N.J. • RICHMOND, CALIF. • CEDARTOWN, GA. • BOSTON, MASS. • CHICAGO, ILL. • LONDON, CANADA

RESEARCH

Rez Division of American Petrochemical Corp. (Minneapolis), is now available for preparing rigid polyurethane foam by water-blown, Freon- or Genetron-blown methods.

•

Weed Killer: Chipman Chemical Co., Inc. (Bound Brook, N.J.), is out with a weed killer called Butoxone, which contains 4-(2,4-dichlorophenoxy) butyric acid dimethylamine salt. It's useful in controlling broadleaf weeds.

•

Zirconium Chloride: The Chicago Development Corp. (Riverdale, Md.) now offers a special form of zirconium chloride (Zirklor) for use as a high-temperature lubricant and sealant, to produce thermoplastics with unusual properties.

LITERATURE

• The Atomic Energy Commission now offers 45 technical-level 16-mm. films, many of which are in color, covering major nuclear applications and research activities. They include 10 films on power reactors, 9 on research and test reactors, 3 on reactor safety, 7 on fuels and processing, 1 on particle accelerators, 1 on controlled thermonuclear research, 1 on agricultural research, 11 on biochemical work, and 2 on industrial applications. Films are for sale or loan. Write U.S. Atomic Energy Commission, Washington 25, D.C.

• A new 28-page compilation of abstracts of patents, and journal references on dimer acid is available at no cost from Emery Industries Inc., Dept. 5, Carew Tower, Cincinnati, O. (Technical Bulletin 412).

APPARATUS

Airborne Particle Sampler: Machine and Instrument Design Corp. (New York) offers a sampler for detecting radioactive airborne particles.

•

Infra Red Incinerator: Small amounts of organic material that must be dried and ashed can be handled easily in National Instrument Co's (Baltimore) new infra red incinerator. It eliminates the need for large heating ovens, works on 110-volt ac. or dc. current, incinerates by focusing infra red rays with a gold-plated parabolic reflector.

C3 FLUOROALCOHOL	$HCF_2CF_2CH_2OH$ (1H, 1H, 3H-tetrafluoro-1-propanol)
C5 FLUOROALCOHOL	$H(CF_2CF_2)_2CH_2OH$ (1H, 1H, 5H-octafluoro-1-pentanol)
C7 FLUOROALCOHOL	$H(CF_2CF_2)_3CH_2OH$ (1H, 1H, 7H-Dodecafluoro-1-Heptanol)
C9 FLUOROALCOHOL	$H(CF_2CF_2)_4CH_2OH$ (1H, 1H, 9H-Hexadecafluoro-1-Nonanol)
C11 FLUOROALCOHOL	$H(CF_2CF_2)_5CH_2OH$ (1H, 1H, 11H-Eicosafluoro-1-Undecanol)

news from Du Pont

Additional product opportunities with fluoroalcohols

This new group of intermediates offers unusual solvent properties, low toxicity, a high level of chemical and thermal stability, and a convenient source of fluoroalkyl groups for incorporation into your product to modify surface properties.

Perhaps you are working on a product that these new fluoroalcohols will bring to a reality. The fluoroalcohols contain from 57.5 to 71.4% fluorine. Their wide range of chemical properties makes them well suited for a variety of industrial applications.

For example, the lower fluoroalcohols will dissolve a group of polymers for which no other solvent is known.

The density of liquid members of the series is exceptionally high (1.48-1.66), indicating possible value in instrument fluids. Fluoroalcohols have the lowest refractive index of all known organics (1.320-1.318), of paramount interest to manufacturers of optical products and waxes.

Fluoroalcohols can be oxidized to corresponding groups of acids. They can be esterified to yield products with useful surface active and thermal properties. Fluoroalcohols undergo the characteristic reactions of alcohols, but their fluorine content modifies their reactivity.

Supplied as technical grade products, the fluoroalcohols can be of utmost interest to researchers in the pharmaceutical, dye, and many other fields. Surfactants, corrosion-resistant coatings, anti-foaming agents are but a few of the possible uses for fluoroalcohols.

Evaluate a sample yourself. A request on your letterhead will bring technical information and a sample. Write to E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Dept., Dyes & Chemicals Division, Wilmington 98, Delaware.

DU PONT
REG. U. S. PAT. OFF.

DYES AND CHEMICALS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

DOW | **BASIC CHEMICALS making profit news**

Sometimes new developments in basic commodity chemicals are not immediately made known to potential users. But with the profit squeeze pinching budgets and dividends tighter and tighter, this advertisement (and others to follow) hopes to speed up the process of spreading good news. The news items on these two pages are designed to help you keep your finger on what is happening in the world of new uses for established, well-known chemicals—as well as keeping you up to date in the world of new chemicals.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

Route to:

_____

_____

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GLYCOL ETHERS SOLVE TOUGH CASES

Specialized solvent problems, long a major plague of fast changing formulations, are bowing to the unusual versatility of glycol ether solvents. Dow now offers industry an ethylene and propylene series of glycol ethers (trademarked Dowanol) that promises to dissolve many headaches by saving both dollar-precious time and research-precious dollars.

A recent TV late, late movie featured a scientist who discovered the "Universal Solvent". It dissolved the universe. Dow's increasingly popular Dowanol® products aren't *that* good—but they are versatile!

They combine the best of the solubility characteristics of alcohols, ethers, and hydrocarbons. And they have a remarkable range of boiling and pour points. Small wonder they find application in many diverse areas of chemical processing. For example . . .

Take hydraulic brake fluids. Almost two tons of speeding automobile are controlled by the brake drums through the brake fluid. A recent "AAA" bulletin warned that the use of sub-standard fluids was creating a serious safety problem . . . in fact, twelve states have already legislated against it. Recent changes in car-making—increased horsepower, greater weight, automatic transmission, smaller wheels—have all combined to raise the temperature to which brake fluids are subjected.

That's where Dowanol products come in. They help manufacturers of hydraulic brake fluids to obtain formulations with a high boiling point and favorable viscosity characteristics and also hold fluid ingredients in phase over a wide temperature range.

Excellent solubility, with both organic compounds and water, marks Dowanol products as extremely versatile.

Now paints and lacquers don't blush like they used to, thanks to Dowanol. Blushing used to occur because of a deficiency of active solvent in the lacquer formulations. This would cause partial precipitation of nitrocellulose during drying. The lackluster result: dull finish and pinholing. Because of their exceptionally powerful solvent power toward these components, Dowanol glycol ethers minimize and often prevent this.

Or take "orange peel", a condition in which the surface of lacquer resembles the texture of an orange skin. Dowanol in the formulation overcomes it . . . easy as peeling an orange.

"Let Dowanol do it", is the watchword in dozens of industries that have solvent problems. Dowanol products are used by manufacturers of textiles as dye solvents, manufacturers of ink solvents, dry cleaning solvents, spotting fluids, soluble oils, rust removers, cosmetics, metal parts cleaners, liquid soap ingredients . . . in almost any product where high solvent action and low evaporation rate are essential. (An added plus: both the ethylene and the propylene series of Dowanol products have a low degree of toxicity—present no serious health hazards.)

Best proof that more and more chemists feel that Dowanol products pro-

DOW CHEMICALS basic to the chemical processing industry

Alkylene Oxides, Glycols • Industrial Preservatives • Polyalkylene Glycols • Glycol Ethers • Alkalies • Phenolic Compounds • Brominated and Chlorinated Aliphatic Compounds • Inorganic Acids • Halogens • Organic Acids and Esters • Inorganic Chlorides, Bromides and Bromates • Nitrogen Compounds • Amino Acids • Glycerine • Salicylates • Phenyl Phosphates • Heat-Transfer Media • Flotation and Flocculating Agents • Chelating Agents • Ion Exchange Resins • Methylcellulose • Magnesium • Plastics • Aromatics

vide more and more answers to tough solvent problems is the recent announcement from Midland that Dow is doubling production of these chemicals to meet the fast growing demand.

DOWICIDE:

How white is your white?

RIDDLE: When is *white* shoe polish *brown?* ANSWER: When bacteria and/or fungi cause decomposition and color change. This actually happened to a nationally-known manufacturer of shoe polishes. After his liquid white polish was bottled for a few weeks it would turn brown—either on the supermarket shelf or in the home.

Dazzling white puts a polish on sales.

Product doctors were called in. They recommended the addition of a Dowicide® preservative to the formula. RESULT: "Color problem licked. Product now whiter than snow . . . doing just fine saleswise, too!"

Thousands of other organic compounds, polishes, floor waxes, starches, laundry products, are protected from bacterial or fungicidal breakdown by Dowicide preservatives. There is a whole family of Dowicide products . . . 14 of them, at last count, each with special properties for different protective jobs. Dow has prepared brochures that describe them and their myriad applications. The answer to a product breakdown problem might be at the other end of a phone call.

★ ★ ★ ★

For further information on these products and other Dow chemicals, write THE DOW CHEMICAL COMPANY, Midland, Mich., Chemicals Sales Department 913AM2-21.

THE DOW CHEMICAL COMPANY
Midland, Michigan

DOW

CHLOROTHENE: *Sprays away high aerosol costs*

Today's profit-minded aerosol men praise the big "package" of advantages offered by the new solvent, Chlorothene® (Dow 1,1,1-trichloroethane, inhibited). It's tops as a replacement for propellants. Case in point: The use of Chlorothene as a vapor pressure depressant in hair sprays where it does double duty as a solvent for active ingredients; in some formulations it eliminates the need for additional solvents. In others, it serves as the "active" ingredient (as in spot-remover formulations).

Many aerosol formulators employ Chlorothene to good advantage because of its low toxicity, high stability, no appreciable fire hazard, and not unpleasant odor. Some salesworthy examples: moth-proofing, insecticide and waterproofing formulations. Best of all, it offers these quality product pluses at an actual saving in cost over more expensive fluorinated compounds!

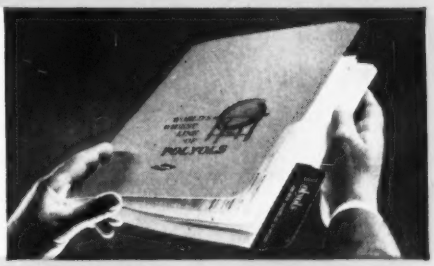
Putting **MORE PROFIT** in your products . . .

Bromine

First Dow product (1897). Vast experience in technology and production of bromine and brominated products. Result: Dow unequalled as source of supply.

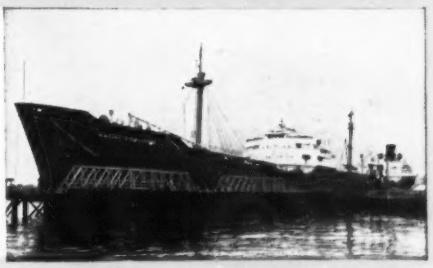
Polyols

"The Men That Make the Most of Them" recommend "World's Widest Line of Polyols" folder. Details included on polyols as well as literature bibliography.



Hydrochloric Acid

Water transportation pioneered by *Marine Dow-Chem* and HCL. Vast network of terminals and shipping points assures quality product delivery on time, in time.



Ethanolamines

New booklet describes latest information on handling and storage as well as detailing improved color characteristics of Dow's triethanolamine.

for Refractories
Rayon
Paper
Rubber
Insulation
Plastics
Ceramics
Feed
Fertilizer
Water Treatment

MAGNESIUM OXIDE — A VERSATILE INORGANIC CHEMICAL. Magnesium oxide is a necessary ingredient in the production of acetate rayon and insulating products. In sulphite pulping operations, it decreases stream pollution; it is a stabilizer in synthetic rubber manufacture and a filler in plastics. More and more high-purity magnesia refractories are being used in open hearth furnaces for increasing steel production capacity. Magnesia supplies the magnesium ion in animal feed supplements, and it is finding application as a fuel oil additive to reduce boiler scale. And there are many other uses for Michigan Chemical Corporation's chemically active magnesium oxide. Call on our technical consultants to help you with magnesia applications.

NEW MgO PLANT. Our new seawater magnesia plant, under construction at Port St. Joe, Florida, will greatly increase our production capacity. If you use calcined magnesite, magnesium oxide and related products in *any* quantity, call Michigan Chemical. We are now scheduling future deliveries from the new plant and invite your inquiry at this time.

Reg. U. S. Pat. Off.

For complete listing of Michigan Chemical products, see your copy of Chemical Materials Catalog or Chemical Week Buyers Guide.

MICHIGAN CHEMICAL CORPORATION

622 North Bankson Street, Saint Louis, Michigan

EASTERN SALES OFFICE: 230 Park Avenue, New York 17, N. Y.

M-58-4

Problem in Phenol's Future

Two new synthetic phenol plants and one expansion of an existing facility will aggravate the problem of surplus capacity.

As a result of these plans, total U.S. synthetic and natural capacity will reach a whopping 872 million lbs./year by the end of '60 — about 53% more than anticipated demand of 570 million lbs. Capacity at the end of '58 was 762 million lbs.—49% more than the estimated 510-million-lbs. production. Two major phenol consumers — Reichhold Chemicals and Shell Chemical—are putting in the new facilities, which will be used to supply their own captive-production needs.

Shell Goes Basic: Shell Chemical will put its first phenol plant—now abuilding—into operation in late '59. Location: Houston, Tex., at the site of Shell's epon resin unit.

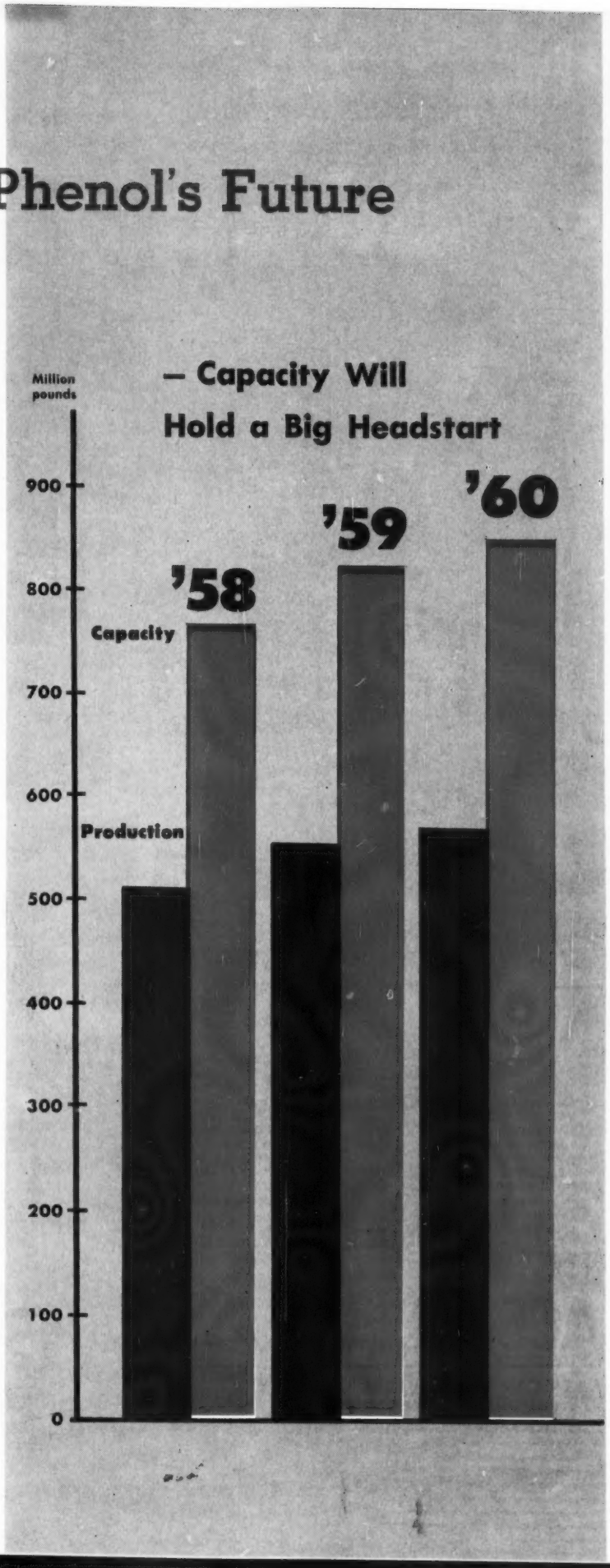
Shell spokesmen are reluctant to pinpoint the plant's capacity, but knowledgeable trade observers estimate capacity at about 25 million lbs./year. In addition, the plant capacity, they say, could easily be doubled, should the need arise.

Shell will employ the cumene route. One reason: acetone is a by-product; both phenol and acetone can be used captively by Shell to make bisphenol-A, an important raw material for epon resins.

A small percentage of the plant's phenol output will go to Shell Oil Co.; the rest will be used captively. As a result, the firm will buy little, if any, phenol from other producers.

RCI Goes West: Reichhold's plans are double-barreled. Engineering studies have started on a $4-5-million phenol plant, at Tacoma, Wash., which will have an initial production rate of 30 million lbs./year, an actual design capacity of 60 million lbs./year. Construction in Tacoma will start in the last half of '59, production startup will be about a year later. The process: benzene sulfonation—the same route used at RCI's Tuscaloosa, Ala., plant.

Meanwhile, RCI's Tuscaloosa phenol facilities will be boosted 18 million lbs./year, to a total capacity



MARKETS

Synthetic Phenol Capacity

	Million pounds (Est.)
Dow Chemical	
Midland, Mich.	220
Monsanto Chemical	
Avon, Calif.	110
Monsanto, Ill.	40
Hooker Chemical	
Tonawanda, N. Y.	90
Union Carbide	
Marietta, O.	85
Reichhold Chemicals	
Tuscaloosa, Ala.	54
Oronite Chemical	
Richmond, Calif.	50
Allied Chemical	
Frankfort, Pa.	40
Hercules Powder	
Gibbstown, N. J.	30
New Plants	
Shell Chemical	
Houston, Tex. ('59)	25
Reichhold Chemicals	
Tacoma, Wash. ('60)	60
Expansion	
Reichhold Chemicals	
Tuscaloosa ('59)	18

of 72 million lbs. This expansion is scheduled for completion by the end of '59.

RCI spokesmen explain the firm's phenol expansions by saying they fit into the company's continuing policy to increase production of basic chemicals. And because RCI is a major producer of phenolic resins, it's obvious that much of the new phenol output will be used captively. Another indication: RCI's choice of the Tacoma plant location—close to existing units that make both phenol-formaldehyde adhesives and the wood preservative, pentachlorophenol.

Phenol-formaldehyde adhesives are used principally in the manufacture

Have you tried MICRO-CEL®

- to absorb liquids
- to provide bulk
- to prevent caking
- to control viscosity
- to extend pigments
- to aid suspension
- to reduce surface sheen

The Powder That Flows Like a Liquid—Micro-Cel, latest development of Johns-Manville Research, will greatly improve the flowability of many products.

New Johns-Manville mineral filler can help you improve products and cut costs

WANT to absorb liquids or control viscosity? Try *Micro-Cel*—it absorbs up to 6 times its weight in water, remains a free-flowing powder even after absorbing twice its weight in liquids.

Want to bulk up your compound for better control of package density? Try *Micro-Cel*—a cubic foot weighs as little as 5 pounds.

Want to prevent caking? Try *Micro-Cel*—its high absorption works wonders in controlling deliquescent products.

Want to extend pigments or reduce surface sheen? Try *Micro-Cel*—it combines fine particle size, large surface area and inertness with high absorption suggesting many applications.

Want to assure better suspension of heavy solids? Try *Micro-Cel*—its particle size, as low as .02 micron, provides uniform dispersion and blending.

Micro-Cel is a brand-new line of synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. Its unique combination of properties has already brought important benefits and savings to many processors. Maybe you will be next. Just mail coupon for further information, samples and technical assistance.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville MICRO-CEL

SYNTHETIC CALCIUM SILICATES

A PRODUCT OF THE CELITE DIVISION

Johns-Manville, Box 14, New York 16, N. Y.
In Canada: Port Credit, Ontario.
Please send ☐ additional data ☐ samples of Micro-Cel
I am interested in formulating the following products:

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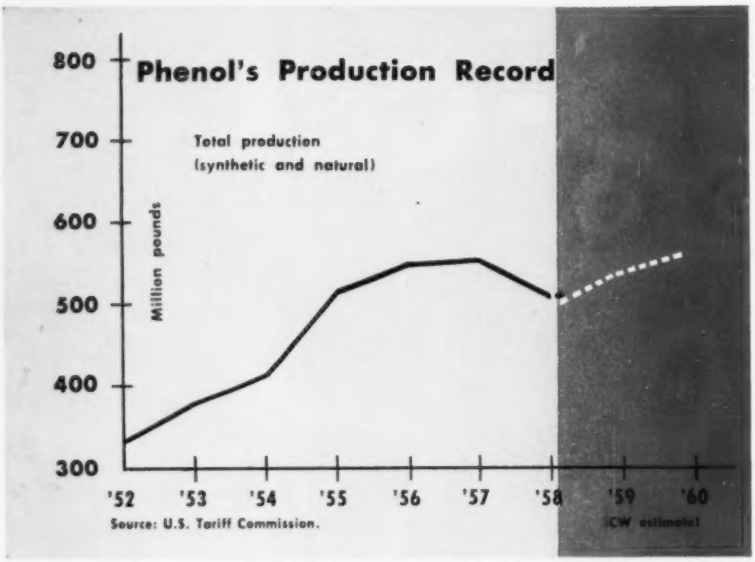
☐ Please have local representative contact me

Name_____Position_____

Company_____

Address_____

City_____Zone_____State_____



of plywood (*CW, Nov. 22, '58, p. 65*). The field is expanding: in '54, 28 million lbs. of resin were used to make plywood; currently, more than 48 million lbs./year are being used.

And there's still another angle to RCI's phenol-producing plans that makes the project appear more attractive. A by-product of the sulfonation process — sodium sulfite — is readily salable to nearby paper manufacturers. The by-product sales thus help reduce the unit cost of the phenol.

More Northwest Growth: Incidentally, RCI points out that nearby Canadian and U.S. manufacturers aren't the only potential customers for its phenolic products; access to shipping facilities will give the firm a decided advantage in supplying the growing Alaskan market.

Reichhold won't be alone in vying for the growing Pacific Northwest phenol markets. Dow Chemical of Canada is dickering for land at Fort Saskatchewan, Alta., to be used as the site of an ambitious chemical complex that will include phenol-producing facilities. Engineering studies are now under way; construction will start in early '60.

A chlorine-caustic unit will be built first, followed by the phenol unit. Other installations planned for the same site include: hydrochloric acid, glycols, plastic foams.

Supply/Demand Situation: Phenol production in the U.S., as a whole, dropped about 7% in '58, to an estimated 510 million lbs., from '57's all-time high of 556 million lbs. The slump is, of course, generally attributed to the nation's over-all decline of business activity, because phenolic resins—the major outlet for phenol—are used extensively in manufacture of a wide variety of consumer and industrial products.

The '59 outlook is still uncertain, but trade observers are hopeful that phenol output will regain the '57 level of 556 million lbs. And there are reasons for this optimistic view; for one, demand for phenol increased significantly during the last few months of '58.

Moreover, the phenol business isn't tied entirely to resin production; it finds sizable outlets in a variety of applications, e.g., detergents, fibers, agricultural chemicals, germicides.

Within the next few years, bigger demands for phenol are envisioned in production of caprolactam, alkyl phenols, antioxidants and wood-scrap binders (*CW, Dec. 27, '58, p. 73*).

Over the long run, demand for phenolic resins will likely increase steadily—more or less in proportion to U.S. population growth. It's highly unlikely that phenolic resins will make any spectacular gains such as could be scored by some competing materials. Color instability is the main drawback that hampers such expansion of phenolic resin demand; on the other hand, weatherproofing properties and good adhesion to metals assure continuing, substantial demands for these resins. As a result, any truly big consumption increases for phenol will have to be sought in other areas.

There is, of course, a continuing search for new applications; but producers can't—or, perhaps, won't—point to any such possibilities in the near future.

Brighter for Silver

Rapidly mounting demand for silver, spurred largely by fast-expanding industrial needs, raises a pertinent question: Is a silver shortage imminent?

Apparently not—at least not in the near future. One reason: return of lend-lease silver has sharply increased U.S. Treasury free stocks from which the metal is withdrawn for domestic coinage and sales. Of the total 410.8 million oz. the Treasury loaned to other nations, 369.3 million oz. have already been returned. As a result, the Treasury's stocks have increased by 188.6 million oz. since '54.

The long-range picture might be different, for returned lend-lease stocks won't last forever. More important: silver production is intimately tied to the erratic copper, lead and zinc markets, whose long-range prospects right now hardly look bright.

Very little silver is actually mined for itself—most is a by-product of the other mining operations. But because it's the over-all revenue per ton of ore that determines whether a particular mineral deposit is mined, a fair price and a good market for silver will encourage production of all associated metals; likewise, the fortunes of copper, lead and zinc markets will greatly influence future availability of silver.

Silver Slips in '58: For the first time in many years, world (non-Communist) silver consumption failed to increase, in fact dropped off about 13%, from 289.4 million troy oz. in '57 to 250.5 million in '58. Of the total 38.8-million-oz. drop, 22.4 million oz. were lost because of cutbacks in arts and industry uses; 16.5 million fewer ounces were used for coinage than in '57.

In the U.S. according to estimates by Handy & Harman (refiner of precious metals), silver consumption by arts and industry amounted to

"Dutch Boy" Stabilizer research helps give vinyl flooring color a big lift

The latest in asbestos-filled floor tiles is *color!*

Oyster whites. Soft pastels. Rich reds, blues, and greens. Delicate marbling. Bright new color that lasts like never before.

Credit "Dutch Boy" Stabilizer research for new ways to get such color

With vinyl flooring the problem of color is fourfold. In processing, you have darkening of stock on the hot calender to contend with . . . plus shifts in hue caused by unavoidable impurities in asbestos filler. On the floor, it's progressive darkening from ultra-violet action plus additional hue changes that causes the trouble. Sulfide staining is a problem, too.

A recent National Lead development. "Dutch Boy" Temex* 3 Stabilizer, does away with all four flooring color problems. Solves staining, too. It provides unique double action . . . the best available stabilization against light and heat, plus a "walling off" of impurities that renders them harmless.

*Trademark

Other National Lead Chemical research aids other industries

National Lead chemical research has come up with more than 20 widely used vinyl stabilizers and four unusual thixotropic gelling agents. Each solves problems of product quality in many industries. Electrical insulations, automotive upholstery, anti-fouling paints, inks, many other products benefit.

For details, for technical help in applying these useful "Dutch Boy" chemicals, mail the coupon below.

NATIONAL LEAD COMPANY, 111 Broadway, New York 6, N. Y. KC-1148

In Canada: CANADIAN TITANIUM PIGMENTS LIMITED, 630 Dorchester Street, West • Montreal

Gentlemen: Please send literature checked below:

● **Folders on "Dutch Boy" Stabilizers:**
☐ for vinyl flooring ☐ for other vinyl stocks (specify)

● **Folders on "Dutch Boy" Gelling Agents:**
☐ "Dutch Boy" BENTONE®S (gel organic liquids)
☐ "Dutch Boy" BEN-A-GEL® (gels aqueous compounds)

Name_____ Title_____

Firm_____

Address_____

City_____ State_____

BUY *Dutch Boy*® CHEMICALS

. . . and get the plus of a name you know . . . for quality

85 million oz., 10% less than in '57. But the temporary setback hasn't dampened the optimistic outlook of silver marketers.

Broad End-Uses: Two weeks ago, Ralph Wilcox of American Smelting and Refining spelled out industrial end-uses of silver at the National Western Mining Conference. More than half of the 250.5 million troy oz. used in '58 went to industry.

By far the largest industrial consumer of silver is the photographic industry, which, in the U.S., consumes an estimated 28-32 million troy oz./year; that's about equal to all photographic requirements by the rest of the world.

Favoring future demand increases in this application is the fast-growing popularity of color film; but this doesn't mean proportionately greater demands for silver, because 90% of the silver used in the film is recovered (this compares with 50% recovery in processing of black-and-white film).

Of considerable concern to the photographic industry—hence to silver producers—is the rapid encroachment of magnetic-tape recording techniques into motion picture, television and other specialized markets (*CW Market Newsletter, Dec. 20, '58*). But tape doesn't pose a total threat—at least right now—to photographic use of silver, for the amateur photographer now represents the largest market for film—and he won't soon be using electronic tape to make pictures. In all, the photographic market for silver looks bright, especially in light of additional applications, such as in material used in office photocopying machines.

Second-largest outlet for silver is in silver solders for brazing and similar nonferrous metal bonding. Consumption of silver for solders in the U.S. amounts to about 24-27 million troy oz./year.

Among the more important established applications are refrigeration, air conditioning, automotive and electrical appliance manufacture. Two newer fields of applications are rockets and jet aircraft.

Third end-use—and rapidly growing—is the electrical industry, which uses silver for all forms of electrical contacts where low contact resistance is important. An estimated 18-20 million troy oz./year go into these uses in the U.S.

The outlook for these electrical markets: continued expansion in the U.S. and abroad. More silver will go into appliance manufacture; and now the burgeoning electronics industry is beginning to use more silver for contact surfaces.

The ceramics industry makes much use of silver—in the form of silver carbonate or silver chloride—for toning pink colors in preparing overglaze colors and to produce a yellow-tinted pigment. More recently, there has been growing use of silver powder or flake, combined with glass fluxes and metal compounds, for use as a conductor and electrode material on electronic ceramics.

Ceramics outlets currently account for 1 to 1.3 million troy oz./year of the silver consumed in the U.S. The outlook is for expanded uses in this field also, especially in light of bigger markets in printed circuits for use in radios, television sets, other electronic devices.

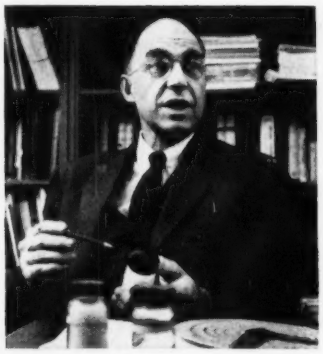
Bigger silver markets are in the offing—in manufacture of primary and secondary silver-zinc batteries for jet aircraft, helicopters, portable TV cameras, torpedoes, guided missiles, and a wide variety of communication, instrumentation and photographic equipment.

The silver-cadmium battery is also finding growing uses in applications where longer life, at the expense of light weight, is desirable. A brand-new type of battery is one made of silver, silver iodide and vanadium pentoxide; it weighs less than 1 oz., reportedly has unlimited shelf-life.

Total use of silver in battery manufacture in the U.S. amounts to about 1.5 million troy oz./year.

In addition to these major markets, silver finds its way into a host of other small and diversified products and uses. Some examples: catalysis, diesel-engine bearings and bushings, coating of copper wire prior to insulation with plastics, desalting of sea-water, dental alloys, manufacture of mirrors and vacuum bottles, pharmaceutical products.

Clearly, the industrial market for silver is no small-change business; and these expanding applications—added to big silver needs for art and coinage uses—strongly underscore the very real need of a long-range balanced supply/demand situation for silver.



Dr. Erle Ayres, Ph.D., Duke University
Industrial Products Department,
Callery Chemical Company

amine-boranes

"their catalytic, color-stabilizing and antioxidant properties and their selective reducing action in non-aqueous solvents are principal points of interest"

Q. Dr. Ayres, what are Amine-Boranes?

A. They are complexes of borane (BH_3) with amines. Most of the secondary and tertiary amines form stable complexes.

Q. What functional groups do the Amine-Boranes reduce?

A. They reduce aldehydes, ketones, and acid chlorides. They are especially useful in non-aqueous systems.

Q. You mentioned stabilization. What do you mean?

A. The slow reduction of carbonyl groups can prevent their accumulation, and later formation of acids and color, in systems susceptible to autoxidation. For example, a low concentration of Pyridine-Borane can prevent discoloration of pyrroles.

Q. Have any new uses for Amine-Boranes been developed?

A. Recent publications have described the use of Trimethylamine-Borane and Pyridine-Borane for the rapid and convenient production of trialkylboranes from olefins. By oxidation of the trialkylboranes, long-chain alcohols can be produced.

Q. Are Amine-Boranes stable in water? How do they compare with borohydrides in hydrolytic stability?

A. Trimethylamine-Borane in water loses about 2-3% of its hydrolyzable hydrogen per day. Higher tertiary Amine-Boranes should be even more resistant to hydrolysis. In general, Amine-Boranes hydrolyze more slowly than borohydrides, especially at intermediate (neutral) pH ranges.

Q. How do acids affect the Amine-Boranes?

A. The Amine-Boranes are stable in glacial acetic acid. Dilute mineral acids hydrolyze them; with Lewis acids diborane is generated.

Q. What are some other solvents for Amine-Boranes?

A. Benzene, ethers and hexane. Pyridine-Borane is also very soluble in alcohol and pyridine.

Q. How toxic are Amine-Boranes?

A. These materials are not Class A or B poisons; toxic effects are easily avoided by standard safety procedures that minimize skin contact, ingestion, and breathing of vapors.

Q. What Amine-Boranes are offered?

A. Dimethylamine-Borane, $(CH_3)_2NH{:}BH_3$; Trimethylamine-Borane, $(CH_3)_3N{:}BH_3$ (white solids); and Pyridine-Borane, $C_5H_5N{:}BH_3$ (a liquid) are available now in large quantities. Other Amine-Boranes will be prepared as compounds with different properties are needed. We'd be glad to hear of your requirements for other Amine-Boranes.

Write or phone for specific information on the Amine-Boranes
Phone: FOrest 4-1130
TWX: Perrysville, Pa. 117

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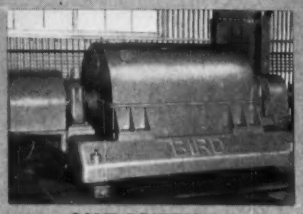

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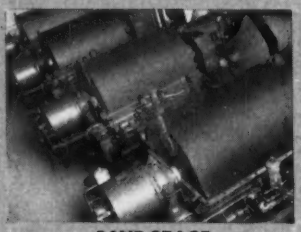

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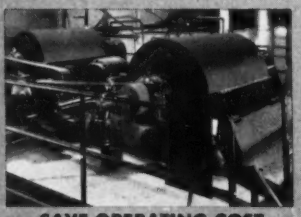

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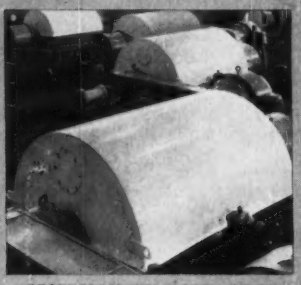

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keeps running for years, with minimum repairs and replacements.

BIRD CONTINUOUS SOLID BOWL CENTRIFUGAL SEPARATORS

The maintenance foreman thinks big, top management thinks small, and the engineer must decide . . .

Whose Idea Is Right Idea on Inventories?

The scene sketched above has occurred in almost every chemical plant. The engineer is caught in the middle. He must reconcile the views of the maintenance foreman, who feels that a big maintenance inventory is needed to run the plant, and management, which is out to save money by cutting inventory. This week, the situation takes on new importance as a possible July steel strike looms large.

A *CW* poll reveals that most companies plan no increased purchasing as insurance against the potential strike. And many of the others that are cautiously building up inventories of steel items say that over-all inventory will nevertheless remain fairly constant, may even drop again this year.

The key question, of course: What is the optimum inventory level?

One company points out that for plants in the $40-150-million investment range, an inventory percentage of 1.5% of investment is realistic. But a Gulf Coast plant reports that its inventory is 1.85% of plant investment. Another plant is at the 4% level. Its maintenance superintendent says he doesn't know what a good figure is.

Part of the problem: using inventory as a percent of plant investment gives a fixed value for inventory. Other methods give a more realistic figure, but they usually involve more work.

For example, inventory can be given as a percentage of total maintenance cost. Then, if a plant is operating at, say, 20% of capacity, total plant investment remains the same but maintenance cost is low.

Similarly, inventory can be related to the amount of power consumed or the pounds of product produced. It can also be related to labor cost.

The average for chemical plants is 3-4% of plant investment. But the figure is usually related to size—a higher percentage for the smaller plants. For example, in oil refineries, generally larger than average chemical plants, inventory is 1.5-2% of plant investment.

In general, though, most companies feel that the best level is 1-1.7% of plant investment. And in many plants, a realistic inventory level is still

to be found. But the trend is down.

For example, Phillips Petroleum began a stock-reduction and materials-inventory-control program about seven years ago. During the first five years of the program, warehouse stocks were reduced about 45% even though plant investment increased about 18%. Inventory reached the level of 1.58% of plant investment. Yet, Phillips reportedly is continuing to push the percentage lower.

At Texas City, Monsanto Chemical cut stock inventory 17% last year by switching from manual to IBM recordkeeping. And another Gulf Coast chemical plant reduced its inventory about 23% in '58 to about 1.2% of plant investment.

Knowing Where They Stand: Regardless of whether these companies plan selective buildups for steel-strike insurance, stand pat, or even plan further inventory cuts, they have the advantage of knowing exactly where they stand. And they've often been able to pinpoint their needs well enough to pass their requirements along to suppliers, let the latter worry about supply positions.

Without inventory controls: buildup, stand pat or cut items in stock?

Says one stores supervisor: "Once we established a regular rather than erratic system, suppliers learned to judge our needs. They know that we'll need so much pipe, so many valves, etc., in a given period and will cover our requirements, regardless of the steel situation."

But it hasn't always been this clear-cut. Up to a few years ago, it was common for maintenance and plant foremen to set inventory policy. Results were often wasteful. As one maintenance engineer explains it: "Back in '38, we purchased a compressor of unusual design. The maintenance foreman took one look at it, decided we needed a spare shaft. The shaft is still sitting in the warehouse. Storage has cost us the original price many times over. That compressor design is now common, and if we had had a breakdown in the meantime we probably could have found an idle compressor around the plant that would have filled in.

"In another process, a blower was the critical component—if it broke down, the process was down. We had no spares for the blower, couldn't get one for five or six weeks. Yet, many other parts of the process were spared."

Some plants still allow process supervisors to set inventory policy. The plant management in these cases readily admits that control of maintenance-job costs and size of inventory is lost. The average process supervisor will find some way to hide extra parts he wants, regardless of any system controls, it's claimed.

But, more important, plants that don't try to control inventory or keep a record of inventory items say unofficially that it can result in a definite tax advantage. "There are any number of ways to expense these items against current cost of production," says one plant manager.

However, companies that have put in inventory control systems point out that the others are often whistling in the dark. "When you have no control over inventory items, the cost of unnecessary items far exceeds the taxes saved," explains the vice-president of one company.

Setting Up the System: Simply taking stock is a big part of the problem of setting up inventory control. Tidewater Oil's Avon refinery had to catalog some 18,000 items in setting up its system (*CW, Aug. 23, '58, p. 65*). Monsanto at Texas City carries 28,000 items in stock, couldn't consider working out the economic inventory level effectively until it was able to "borrow" an IBM 650 that had been installed primarily for research. When Phillips set up its program, 50,000 items were reviewed.

For each item, the stock number, manufacturer's stock number and number of units on hand must be listed. The number of items can often be materially reduced at this stage. Phillips, for example, found that some items weren't necessary for normal maintenance; some were duplicates carrying different stock descriptions; some were obsolete or for equipment no longer in service; some were stocked in a wider range of sizes than necessary, etc.

The delivery time (usually in weeks), determined for each item, is often a major factor in the inventory-percentage difference between plants. Largely, because of the difference in delivery time, one company's West Coast plant carries 1.7% of plant investment in inventory, while its East Coast plant carries 0.5% in inventory.

Standard Oil Co. of California has a 24-hour rule. Any material that is available within 24 hours is not stocked. And, with air transportation, inventories of some parts that previously took a week or two to obtain have now been eliminated. Socal points out, of course, that air transportation would hold only for some of the smaller items, but this is significant because they are the ones that seem to fail most often.

Unit cost is also a factor. Few plants are anxious to stock large quantities of expensive items.

Equipment suppliers and, often, reliable users may be profitably consulted on estimated life of the various items. And, as a company's experience is built up, statistical techniques are sometimes developed to obtain reliable estimates.

Finally, equipment must be classified as to importance. For example, a valve handle that is out of stock won't put a process out of operation, but a valve seat will. Some companies assign weights to different items, use these values in specially prepared formulas to determine reorder points.

What's in a Number: Once the system has been set up, it will not automatically set the amount of stock to be carried in inventory. It will help, but only experience can set a figure that is best for any particular plant.

Yet, regardless of the method of reporting inventory, the control systems adopted within the past few years are paying off. They're showing that inventories can often be cut without jeopardizing production. And they're putting CPI firms in a stronger position to weather a steel strike—if one develops.

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PRODUCTION

Cleanliness Pays Off

New evidence of the importance of cleanliness in preventing industrial dermatitis is now available in figures from a Du Pont case study.

The record spans 17 years in a 6,000-employee plant: 270 cases of occupational dermatitis (an incidence of 6.4%) in '40, reduced to 19 cases (less than 1%) in '57.

Key to the improvement was the overhauling of the plant's sanitary facilities. Washstands were installed at on-the-job locations, so that skin irritants could be washed away directly on contact. And the plant's change houses were modernized, now number about 20.

A shower between clothes changes has cut the incidence of dermatitis.

In the change houses, each man has two lockers separated by a shower room. He changes into working clothes in one locker area; at the end of the day, he leaves his used work clothes in the other locker before taking a shower. Each man is supplied with his own cake of soap for the shower. And work clothes are laundered under supervision of the company.

But improved facilities were only part of the answer. In investigating Du Pont's program, the Assn. of American Soap & Glycerine Producers found ample backing for its own educational campaign. Du Pont augmented its improvements with an intensive educational program, made supervisors and foremen directly responsible for impressing workers with

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160 lbs. of nitrocellulose
and 69 lbs. of alcohol

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On behalf of all customers, to aid in acceptance of lacquer on military items, to assist in preparing specifications, and to demonstrate the advantages of lacquer finishing systems and methods.

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specific sanitation hazards in their areas.

One indication of the need for an educational program: a high percentage of cases of dermatitis are found among mechanical repairmen, who move from one area to another, don't become completely familiar with each area's problems.

EQUIPMENT

High-Vacuum Pump: Beach-Russ Co. (420 Lexington Ave., New York 17) has added a new 1,100-cfm. high-vacuum pump, Model 1000, to its line of rotary piston vacuum pumps. The newcomer is said to be extremely quiet and especially useful on large systems that are handled by mechanical pumps only. It is powered by a 50-hp. motor, features fast pump-down, high efficiency over the entire pumping range.

•

Line Strainer: A variety of aluminum line strainers is now available from OPW-Jordan (6013 Wiehe Rd., Cincinnati 13). Number 187-A comes in ¾- to 4-in. sizes with screwed ends; 187-FA, in 2½- to 4-in. sizes with flanged ends. Screens are available in brass or stainless steel, mesh sizes from 14-300. The aluminum strainers can be used with pressures to 75 psi., temperatures to 250 F. They weigh about one-third as much as cast-iron strainers and do not rust, the company says.

•

Flow Totalizer: A digital inertial mass-flow measurement system for high-pressure gases is a new offering by Inertial Instruments Inc. (1738 Colorado Ave., Santa Monica, Calif.). The Extended Range Digimaf measures flow directly in pounds and displays in digital form either totalized mass flow or mass flow rate, or both. The system measures gas flows of 0.07-7 lbs./second at —100 F to 250 F and up to 6,000 psig. Over-all accuracy for either totalization or flow rate indication is ±2% of total reading. Corrections need not be made for changes in gas density due to constituency, pressure or temperature.

•

Safety Controls: A number of new safety controls are on the market:

• CDC Control Services, Inc. (Hatboro, Pa.), has a fast-responding CompuDyne Surge Control System

for compressors, blowers and exhausters rated at more than 50 hp. The system is said to improve operating stability and reduce power consumption, and to increase the safety of operating such equipment at a level nearer the surge point than was previously possible.

• United Electric Controls Co.'s (Watertown, Mass.) new Type H98 high-pressure control may be used in the pressure range of 10-1,700 psi. Proof pressure is 2,500 psi. and maximum pressure is 3,500 psi. The control is waterproof and explosionproof.

• U.S. Rubber Co.'s newly developed electronic safety device automatically shuts off a Banbury Mixer when its internal temperature exceeds a safe limit. Thermo-Electric Co. (Saddle River, N.J.), which aided in the development, is now offering the Banbury Temperature Limiter.

• Alden Equipment Division, Amercon Corp. (900 North Alvarado St., Los Angeles 26), has added a radio-controlled safety control switch to its Alden Power Scoop for unloading boxcars. The switch allows the scoop to be stopped instantly upon the release of a button.

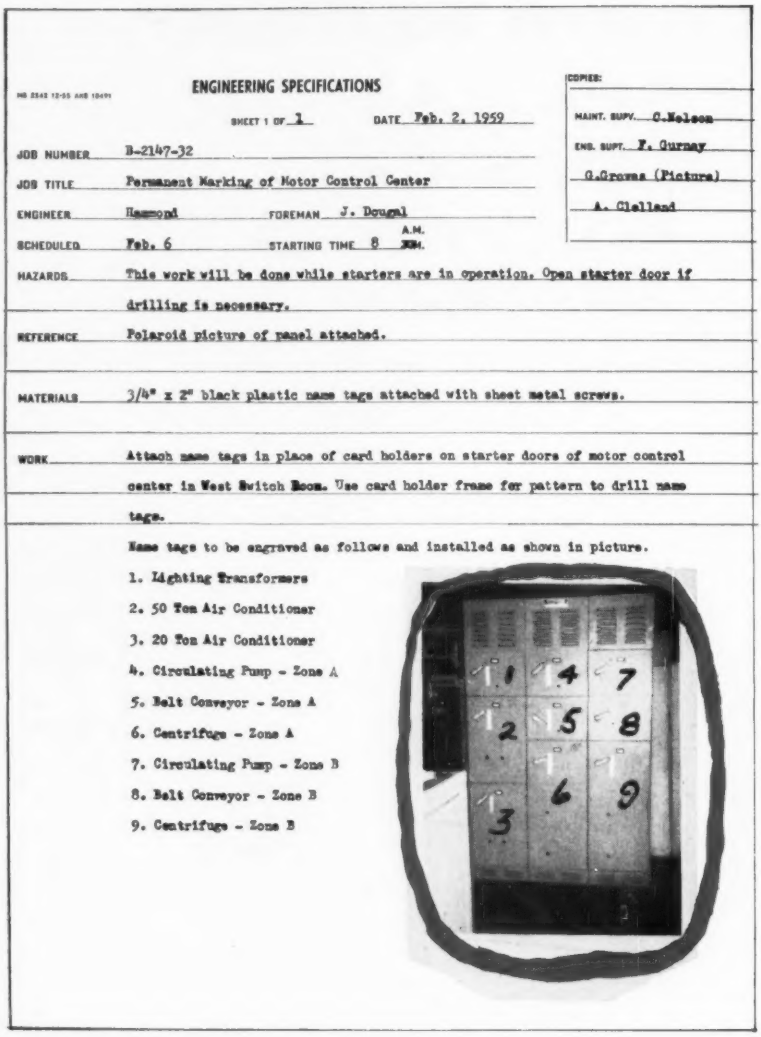
•

Metering Pumps: Three companies offer these new metering pumps:

(1) Hills-McCanna Co.'s (4600 West Touhy Ave., Chicago 46) Masterline series of four models deliver from 0.9-1,030 gal./hour per feed. (Each model is available with either single- or double-feed.) The firm says the new line's attractive hood and improved interior design simplify maintenance.

(2) Lapp Insulator Co.'s (LeRoy, N.Y.) automatic metering pump adjusts pumping rate from zero to full capacity by signals from pneumatic instruments. The Auto-Pneumatic Microflo Pulsafeeder comes in several models, with theoretical capacities ranging from 1,040-2,300 ml./-hour at 0 psig. Pressures up to 2,000 psig. can be accommodated.

(3) Precision Chemical Pump Corp.'s (Waltham, Mass.) Model 600 line of slurry feeders is designed for use with abrasive and corrosive feeds. Units are available with one to six separate feeding heads (one for the slurry, the others for various solutions), each with a capacity of 0.125-2.5 gal./hour. Output can be regulated while the pump is operating.



ENGINEERING SPECIFICATIONS

SHEET 1 OF 1 DATE Feb. 2, 1959

COPIES: MAINT. SUPV. C.Nelson; ENG. SUPT. F. Gurney; G.Grewes (Picture); A. Clelland

JOB NUMBER B-2147-32

JOB TITLE Permanent Marking of Motor Control Center

ENGINEER Hammond FOREMAN J. Dougal

SCHEDULED Feb. 6 STARTING TIME 8 A.M. P.M.

HAZARDS This work will be done while starters are in operation. Open starter door if drilling is necessary.

REFERENCE Polaroid picture of panel attached.

MATERIALS 3/4" x 2" black plastic name tags attached with sheet metal screws.

WORK Attach name tags in place of card holders on starter doors of motor control center in West Switch Room. Use card holder frame for pattern to drill name tags.

Name tags to be engraved as follows and installed as shown in picture.

1. Lighting Transformers
2. 50 Ton Air Conditioner
3. 20 Ton Air Conditioner
4. Circulating Pump - Zone A
5. Belt Conveyor - Zone A
6. Centrifuge - Zone A
7. Circulating Pump - Zone B
8. Belt Conveyor - Zone B
9. Centrifuge - Zone B

Quick Pics Cut Job Time

The most difficult part of many maintenance jobs is supplying a set of adequate work instructions. But Monsanto Chemical's Springfield, Mass., plant has gone a long way toward solving the problem. It is supplementing hard-to-explain work orders with Polaroid Land camera (*above*) photos.

Clayton Hammond, a maintenance engineer, came up with the idea a little over a year ago, while engineering the installation of a complicated ductwork system. He had to tell the craftsmen exactly how the job was to be done, found the explanations themselves turning into a fair-size job. Moreover, frequent checks on the in-progress job would be necessary.

Hammond rented a camera, photographed the ducts and the areas in which they were to be installed. He marked instructions on the photos with a grease pencil. Results prompted the plant engineering department to purchase a camera.

One instance provides a clear-cut example of the value of the use of photos in licking maintenance problems. Identical jobs were performed in different locations; one crew used photos, finished the job in about half the time required by the other crew, which didn't use photos. Monsanto's Everett, Mass., plant had already picked up the technique.

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SHELL XYLENE

. . . has an exceptionally narrow distillation range, is slower drying than toluene.

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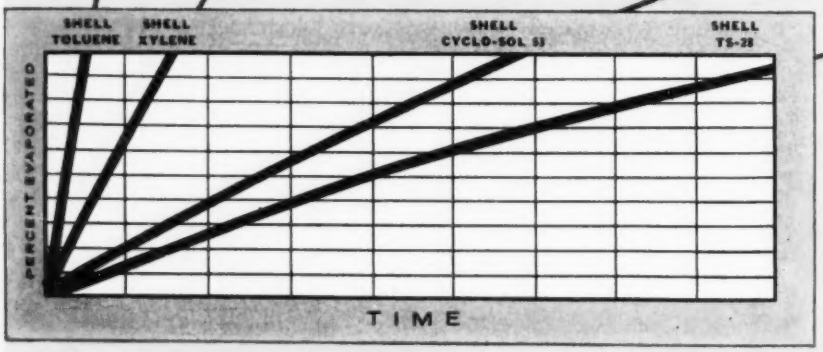

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SHELL

Technology
Newsletter

CHEMICAL WEEK
February 21, 1959

A synthetic lubricating oil that can fill the stiff requirements for jet-engines (*CW, Dec. 20, '58, p. 35*) covered in target specification Mil-L-9236 A (USAF) has been tested at USAF Wright Air Development Center (Dayton, O.). It consists of an ester-type base fluid—developed by Celanese and manufactured at the firm's Point Pleasant, W. Va., plant—and selected additives, one of which is a silicon-containing phenothiazine analog developed by WADC's Materials Laboratory for use as a high-temperature antioxidant. WADC formulated the new lube, which survived sustained jet-engine testing at 400 F bulk oil temperatures.

•

A look at developments in welding techniques of the future will be offered by A. O. Smith Corp. (Milwaukee) at next month's American Welding Society convention in Chicago. One device that is "entirely plausible," according to R. J. Keller, chief engineer of the firm's Welding Products Division: a welding machine that draws electrical power from a thermonuclear source. It could be entirely self-contained, provide extremely high welding amperages. Another potential welder of the future would draw its power from cosmic rays, could be used where power-line connections aren't desirable. And, A. O. Smith's engineers talk of a Buck Rogers-type, self-contained welding gun that would unite two gases, compressed to a solid state, to create the high heat needed for welding.

•

Two discordant notes on automobile-exhaust afterburners were struck in Los Angeles last week. W. L. Faith, managing director of the Air Pollution Foundation (San Marino, Calif.), told the American Society of Civil Engineers, "A great deal can be learned by engineering development studies and extensive tests of today's crude afterburners *(CW, Jan. 31, p. 74)*, but it would be a mistake to believe they will be the ultimate answer to the automobile exhaust problem. Our greatest advances . . . are still ahead of us."

A. J. Haagen-Smit, California Institute of Technology biochemist, told viewers of the school's weekly television program that such equipment is unlikely to be generally applicable before '65. And by then, the 50% reduction in hydrocarbons and nitrogen oxide it is expected to effect would no more than offset the increase in automobiles and population in the Los Angeles area.

•

Semicommercial-scale production of acrolein derivatives got under way last week at Shell Chemical Corp.'s new market development unit at Martinez, Calif. The $2-million plant contains several reactor and purification systems that can be used in various combinations to turn out a wide range of products developed by the company's researchers. Capacities are larger than the usual pilot-plant batches, range from 1,000-lb. lots to tank-car quantities. Initial products made in the new unit were described only as "several derivatives of acrolein."

Natural gas will replace coal as a source of raw materials for ammonia and ammonium nitrate at Cyanamid of Canada Ltd.'s Welland, Ont., plant. A $5-million, 12 months' conversion program under way will increase capacity of the plant and provide more-balanced output of nitrogenous fertilizers.

•

Molybdenum metal powder can now be made in one step via a new reduction process invented by Lester Supiro of East Orange, N.J. Metals and Residues, Inc. (Springfield, N.J.), which has rights to the process, estimates the new single-stage reduction will increase production rates by as much as five to eight times that obtainable by present two-stage processes (molybdenum oxide is generally reduced first to the brown oxide at 400-500 C, then to the metal at 1000-1050 C). Other potential advantages of Supiro's route: economy of energy; higher purity of powdered molybdenum metal; higher recoveries. The process may also be used to make tungsten powder from ammonium paratungstate and tungstic oxide.

•

New antistatic agents and pharmaceutical intermediates are included in a new class of polyurea compounds covered in preliminary German Patent DAS 1 042 892 to Farbenfabriken Bayer AG. (Leverkusen). The compounds are made by reacting phenylcarbamidesters of diaminosulfonic acids or diamino carbonic acids with organic diamines. Water-soluble, they form solutions of high viscosity.

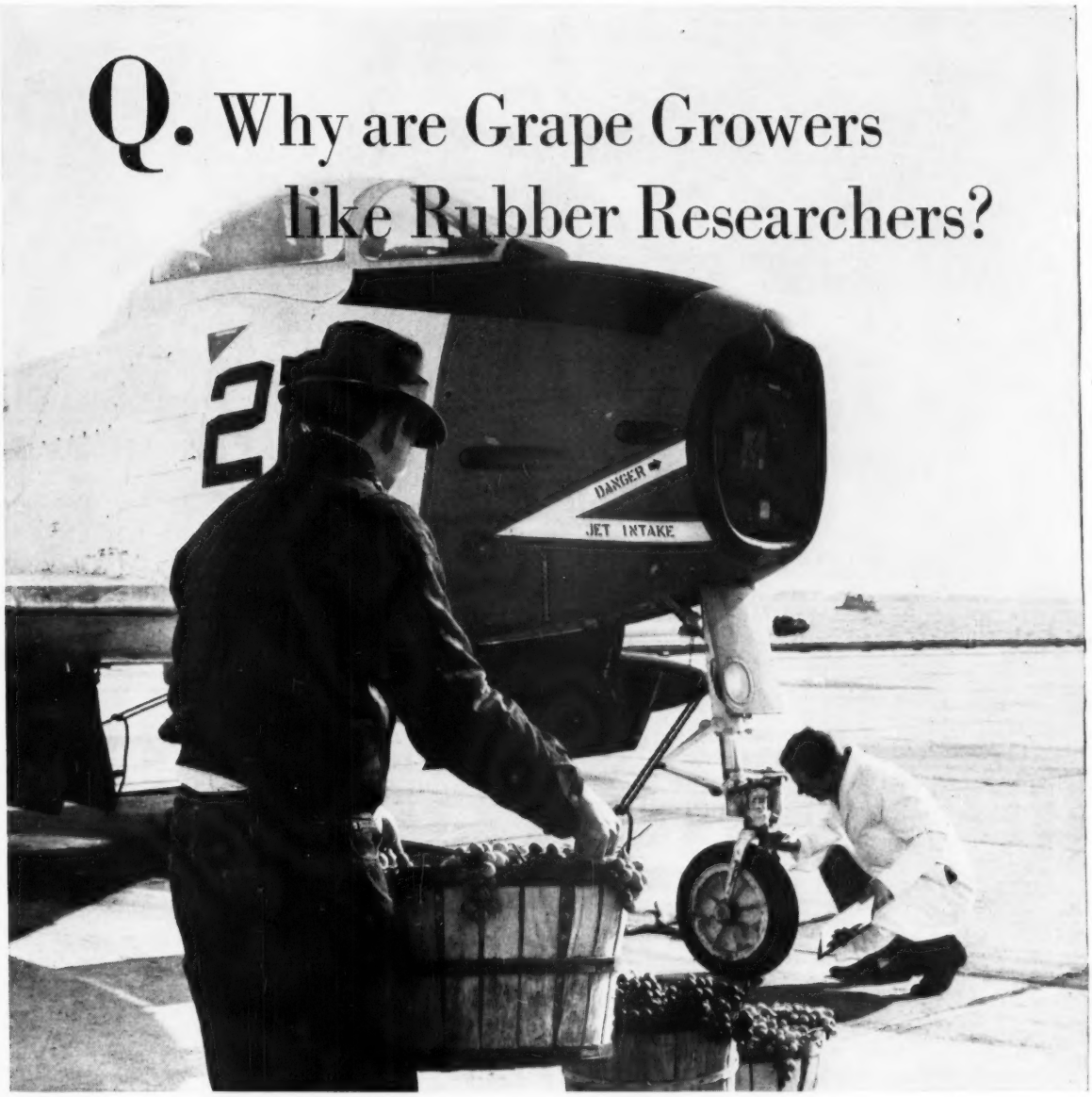
•

Wider use of hard-wood pulp may stem from research in sodium borohydride bleaching at the Empire State Paper Research Institute (Syracuse University). Assistant professor of pulp and paper research Philip Luner finds that 1-2% of sodium borohydride, based on the weight of white birch cold-soda pulp, increases the latter's reflectance (brightness) 25% by reducing chromogens (e.g., carbonyl groups on lignin) in pulp. Luner's research, aimed primarily at delineating the role of chemical reduction in hardwood bleaching, will be presented in detail at next week's meeting of the Technical Assn. of the Pulp and Paper Industry in New York. Still to be settled: the economics of sodium borohydride bleaching (now $15/lb., the compound may eventually cost $5/lb or less); mechanism of other reducing agents such as zinc hydrosulfite.

•

Now the Russians have come up with a plant growth chemical said to be similar in chemistry and mode of action to gibberellin. Unlike gibberellin, however, the new compound is isolated from a culture of fusarium fungus obtained from soil in the Moscow region. (Gibberellin, generic name of several related chemicals, is obtained from filtrates of the *Gibberella fujikuroi.).* Nikolai Krasilnikov of the Academy of Sciences reports that the new compound, named both Soviet Gibberellin and G-1, has been obtained in crystalline form. Tested on peas, the compound increased dry mass yields 90% vs. 25-30% using gibberellin, according to Krasilnikov.

Q. Why are Grape Growers like Rubber Researchers?



A. ***Exciting advances in both fields are directly related to chemical progress pioneered by Merck.*** Thanks to GIBREL®—Merck's new plant growth stimulant—grape growers are able to increase berry size and crop yield by as much as 50%. Farmers everywhere are vitally interested in more efficient crop production with GIBREL. Its "vitamin-like" action triggers normal growth in many plants by supplementing the growth-promoting substances naturally found in plants.

Another Merck chemical, MAGLITE® Y, meets the special processing requirements of the rubber industry's most important new synthetic—a heat-resistant elastomer with promising applications in jet aircraft tires and other rubber products that must perform under extremely high temperatures. A reactive magnesium oxide, MAGLITE is also available in D, K and M grades that are particularly well suited for various product or processing needs of many different elastomers.

MAGLITE and GIBREL are representative of Merck research and production that speed progress in nearly every field served by chemistry. For technical information bulletins on either product write to Department CW-1

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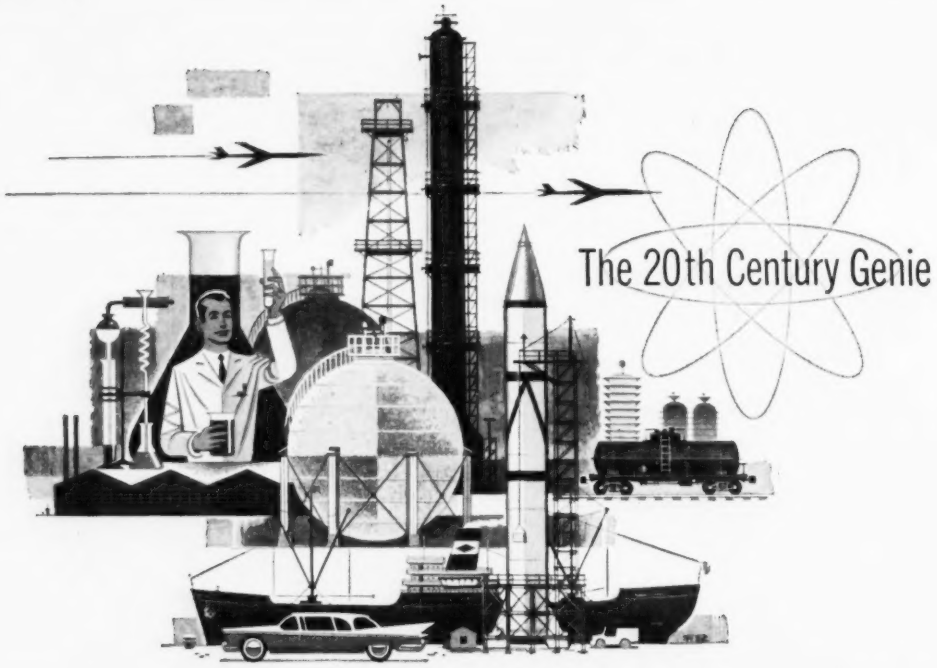

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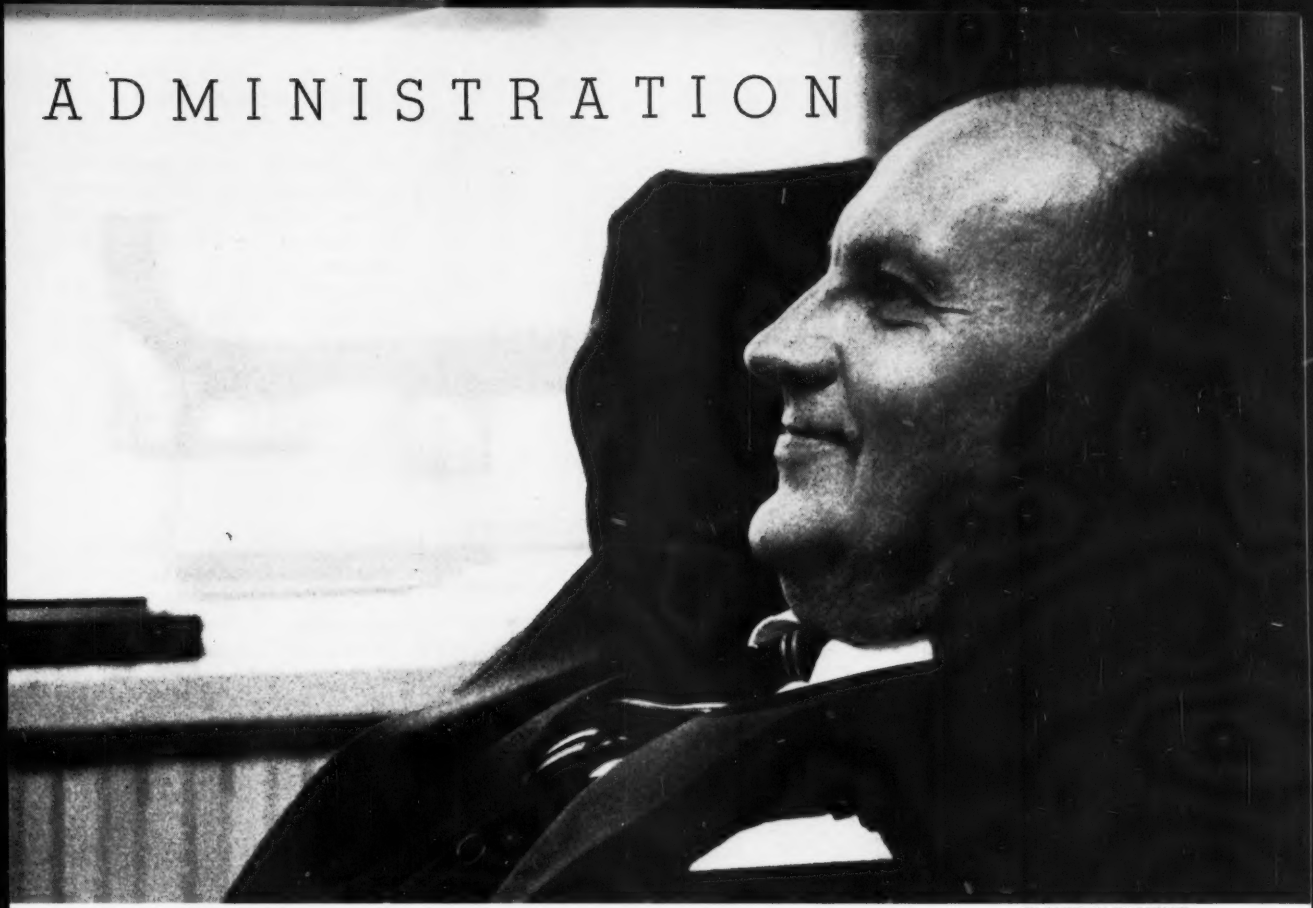

CW PHOTO—E. WALLOWITCH

Attorney Willis: His outspoken views spark a new approach to protection against product liability.

Man in the Middle in Liability Melee

New York attorney Everett Willis this week sits center stage in a legal drama about industry and the looming specter of product liability. His outspoken views on the hotly debated question thrust him squarely in the middle, and it appears that his suggested solution may contain the seeds of a happy ending for industry.

At the start, Willis—a member of the law firm of Dewey, Ballentine, Busby, Palmer & Wood and an authority on corporate product liability—had only a spectator's interest in the unfolding drama. Center of events was Cutter Laboratories and its 49 poliomyelitis (Salk) vaccine suits. But as developments occurred (Cutter was found liable for damages in six suits on the basis of implied warranty, two testcase suits were appealed), Willis spoke out, called attention to the judicial trend that has resulted in the doctrine of product liability being pushed toward the heart of industry, the manufacturer himself. Willis' remarks appear to have crystallized industry thinking, helped several industry groups to decide to come to Cutter's aid with friend-of-the-court (amicus curiae) briefs.

Willis' Views: "Despite press reports," Willis told *CW*, "the legal issues involved in the Cutter cases are not novel. Strict liability (liability for personal injury without regard to actual negligence) in cases of implied warranty has been the rule in a majority of states for many years.

"There has, however, been a noticeable change in the law. The change has been an increasing tendency on the part of the courts to impose direct liability on manufacturers (rather than ultimate vendors) whose products cause personal injury."

Willis attributes the change to the prevalent judicial theory that the risks of life should be borne not by individuals (as in the past) but by the one in a position to distribute the loss, i.e., the manufacturer.

Suggested Remedies: Willis offers several possible remedies to ease the financial burden on the manufacturer that's likely to result from product-liability suits. One would be product-liability insurance.

Another possible remedy: A "disclaimer," by which a manufacturer would "contract out" of liability by the use of strong language—perhaps on the product label — incorporated in the sale of the product.

Willis prefers, however, a statutory limitation of the warranty liability, that would define in advance the maximum risk. There's reliable evidence that the federal government is considering such a law.

Cutter Case Background: At the center of the present product-liability controversy stand the Cutter suits. The cases stemmed from charges in '55 that a number of children inoculated with the Salk vaccine manufactured by Cutter became ill with polio.

Two of the cases were selected as test cases and tried before a jury in Alameda County, California, superior

court. Cutter was charged with negligence in producing and testing the vaccine, and with breach of implied warranties of "merchantability and reasonable fitness."

The jury said Cutter wasn't negligent, that the vaccine had been manufactured according to government standards. But the Berkeley, Calif., firm was found liable for breach of implied warranty. The injured consumers appealed the negligence ruling, Cutter appealed the warranty decision.

In its brief now under consideration by a California appellate court, Cutter cited what it felt to be errors in trial judge Thomas Ledwich's instructions to the jury.

Among other things, Cutter cited the court's refusal to admit as evidence the company's theory regarding warranty—that the vaccine produced was the Salk vaccine and that, consequently, Cutter's "duty" with regard to negligence was performed and its implied warranty, if any, was complied with when it conformed to government standards.

Friends of the Court: As little as two weeks ago American Pharmaceutical Assn. filed a friend-of-the-court brief with the appellate court. The American College of Physicians, and the Pharmaceutical Manufacturers Assn. had already done the same.

APA attacked the trial court jury's decision, insisting that the doctrine of implied warranty is not applicable to pharmaceuticals and biologicals dispensed solely upon prescription.

In its brief, its first such entry into a litigation, the College of Physicians cautioned against the "creation of an absolute liability concept." The association warned that such a concept would greatly impair future progress, because "researchers and doctors would be unwilling to try new drugs on patients."

Future in Doubt: Whatever the outcome of the Cutter cases, pharmaceutical management has been brought face-to-face with the product-liability puzzler. But the question is not likely to be limited to the pharmaceutical industry and consumer products. The poser still before industry: How can the manufacturer cloak himself with some measure of protection if his product causes personal injury in the absence of negligence?

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CW PHOTO—ALFRED WAGG

Jessup: 'Too many bosses and their subordinates have different ideas of their mutual responsibilities.'

Counselor Reconciles Bosses and Bossed

"They don't understand each other," says university dean-management consultant Joe Jessup, five open fingers jabbing the air. "That's why supervisors are often disappointed in their subordinates, and vice versa." This simple thesis is the crux of a new counseling program that Jessup will soon be laying before prospective clients in the chemical process industries.

In essence, Jessup's program is a communications plan. Aim: to get managers and subordinates to analyze and define their jobs so that each can get a clear idea of what's expected of him, what he expects of those he works for, and with.

To do this, Jessup and associates interview managers and subordinates, analyze and integrate resulting information with the aid of the interviewees. Result: an outline of each individual's job demands. They include:

(1) Description of job assignment.

(2) Definitions of responsibility, authority and accountability as well as work objectives.

(3) Analysis of the job in terms of what each individual does personally, as opposed to those jobs he delegates to others.

(4) Analysis of the knowledge and skills needed by subordinates and associates to get their own jobs done.

(5) Analysis of the individual's personal history and a summary of each of the qualities he feels he should develop.

The man's plans for self-improvement are set down at this point.

Jessup's program has already been piloted in several Army Chemical Corps installations—with results, he says, that prove its effectiveness. Sample findings: managers and subordinates are often unaware of each other's capabilities; many executives begin to realize they don't delegate enough, or are delegating to the wrong subordinate.

Jessup's ideas crystallized during his experience in industry and as a civilian working for U.S. military agencies. He began thinking about the communications problem while on his first job, as a soap salesman. "Even though I was surpassing my dollar sales quotas month after month," he recalls, "it took me three years to realize a point my boss kept trying to make—that I wasn't selling the products on which the company makes money. I just hadn't understood that, though dollar sales were fine, the company wasn't profiting enough from them."

His feeling that misunderstanding often exists in working relationships was further strengthened several years ago. As an experiment, he asked a friend, manager of a company in Washington, D.C., to list in order the five things he most expected from his subordinates—then, without coaching, to get his subordinates to list the five most important elements of their jobs.

Results were eye-openers. In no case was "informing the boss" listed, and there was wide disagreement on

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the importance of other tasks. So significant was this to Jessup that today he makes such a test an important element of his counseling. He reports that time after time managers who are sure things are well understood in their departments find enough misunderstanding to warrant counseling.

To get effective results from the program, Jessup says, the top man in the organization has to be sold on the system and work at it. "Once he and his top aides are in agreement, we take the program a step further down the managerial ladder: the aides and their subordinates apply the system to their own job relationships."

Jessup — who gained his business background working for Procter & Gamble and Seeman Bros., among others—believes that once the program catches on, it becomes self-renewing and self-administering. The process may be repeated at regular intervals, once the machinery is set up.

In one recent experiment managers each rated subordinates by degree of understanding of assignments. Then they asked subordinates to list, in order, the seven most important jobs they do. Jessup discovered that in 31.6% of nearly 972 manager-subordinate relationships there was lack of agreement on responsibility, authority, and objectives. "And," says Jessup, "in many organizations, the percentage is higher than that."

Jessup—whose consulting firm is headquartered near George Washington University, where he is assistant dean—is preparing to offer his plan on a wide scale soon. He'll stake his hopes for success on the theory that fewer misunderstandings makes better managers.

'Equally, the boss often considers his subordinate incompetent.'

Putting a Better Face on the Company Image

Early next month, Abbott Laboratories management will see the first result of a broad, new campaign to give physical and visual consistency to the company's corporate image. At that time, George Nelson and Co., New York industrial designer, will make the first presentation of designs for a new Abbott trademark.

Abbott has embarked on a major, long-term project of face-lifting, following an unsparingly critical scrutiny of the face it has been turning to the public.

As Abbott Vice-President Charles Downs, who is marshaling the project, explains it, "A lot of things go into building a company's corporate image: labor and community relations, product quality, sales philosophy, nature and stature of research. But no less a significant ingredient is the physical look of that company. The design of its letterheads, trademark, ads, brochures, packages and labels give the public its first impression of the company."

To enhance this image, Downs and his staff have in work a three-pronged program:

- To make the design of all Abbott graphic presentations the most modern and distinctive in the pharmaceutical industry.
- To integrate this design so that it will add up to a strong corporate identity reflecting the character and ideals of the company.
- To keep this design up-to-date through planned, evolutionary change.

Need for the New: The need for change has become evident to Downs. He says, "Over the past several years the makeup of Abbott's graphic materials has become increasingly chaotic. Items are amateurish, unattractive and outdated in appearance. Throughout there's a lack of strong identity."

For example, Abbott is now using 10 different letterhead designs on stationery and business forms. And three or four different trademarks grace various Abbott graphic materials. A single product carries one of more than a dozen different labels before it goes to market. And it is marketed in at least a half-dozen different bottles, packages or cartons. Use of the company color—blue—varies erratically, often isn't used.

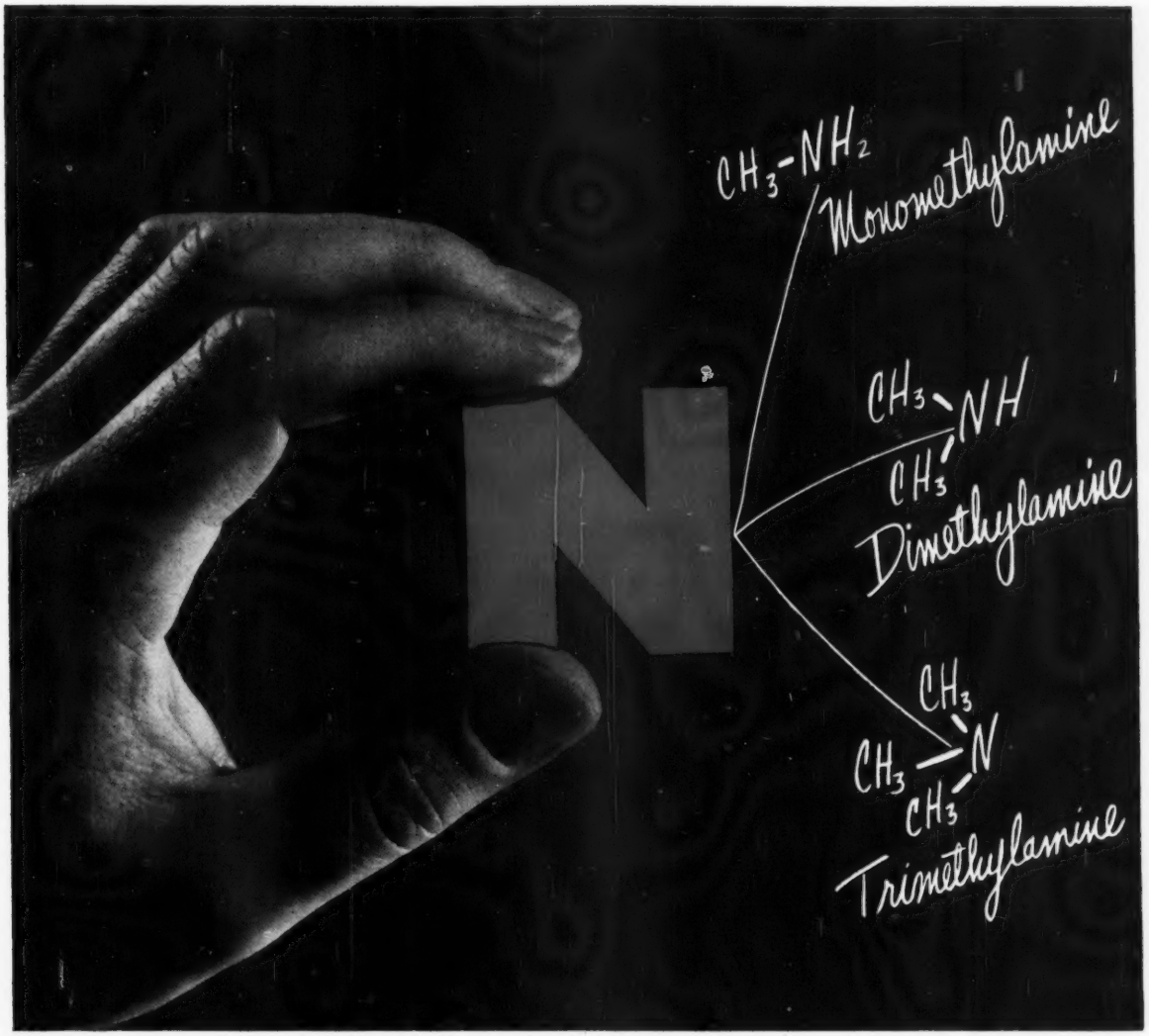
"The result of such chaos," Downs declares, "is to undermine and dilute the corporate image and solid reputation that Abbott has so painstakingly built up over the years." Chief reason for the birth and propagation of this unsatisfactory situation, in Downs' opinion, was the absence of a central corporate authority with responsibility for over-all control of Abbott's graphic presentations. With the inception of its new program, Abbott has assigned that responsibility and authority to the corporate advertising department, headed by Downs.

Program: Abbott is just completing a three-month period in which a thoroughgoing appraisal has been made to determine what must be done. George Nelson and Co. is undertaking an evaluation of professional and trade attitudes toward the company's existing graphic materials. It will also make a detailed technical study of Abbott's packaging and labeling requirements so that design recommendations can be meshed as closely as possible with current procedures.

Downs regards this first phase of the new program as the most vital, for it will correlate the basic philosophy of the new Abbott look. Key question: whether Abbott should create a single look for all its divisions, even though each deals with an entirely different public.

After these preliminary questions are answered, Abbott will take the steps necessary to put the findings into effect.

Downs thinks that this next phase will span a period of 8-10 years. Chief reason: the new graphic materials will be gradually introduced as replacements. "We have no intention of just junking the stuff that we have," says Downs. In this way, Abbott expects to minimize the cost of its new look. In fact, Downs believes, once incorporation of the new designs has begun, the only expenditures above normal will be those for services of the industrial design firm.



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ADMINISTRATION

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Rubber Benefits: The United Rubber Workers union has notified U.S. Rubber Co. that it intends to open for negotiation its company-wide contracts dealing with supplemental unemployment benefits and pensions and insurance, in addition to the wage contract up for discussion in April (*CW, Feb. 14, p. 21*). URW says it will serve similar notices on other major producers holding company-wide contracts that expire in April. They are Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co. and B. F. Goodrich Co.

•

Michigan Vote: In a reaffirmation of bargaining representation by the Oil Chemical & Atomic Workers Union, 871 employees of the Michigan Alkali Division of Wyandotte Chemical Corp. have voted down an organization bid by the United Mine Workers, which polled 633 of the total 1,504 votes cast. OCAW has represented the 1,649 employees at Wyandotte since '55. Negotiations for a new contract are expected to begin soon.

•

Atomic Testimony: The Atomic Energy Council of the Oil, Chemical & Atomic Workers Union is preparing to testify on safety rules and federal compensation regarding radiation hazards in the atomic energy field at a five-day hearing of the Joint Congressional Atomic Energy Committee. Hearings begin March 10. Elwood Swisher, OCAW vice-president, will testify for OCAW, representing seven of its locals at Oak Ridge, Tenn., Paducah, Ky., and other atomic energy installations.

•

Du Pont Pensions: If Du Pont Co. stockholders agree in April, employees of the company are in for increased pension plan benefits. Up for consideration are changes that would give a vested right to a deferred pension to any employee with at least 15 years' service whose employment ends for any reason, and an option by 15-year employees who are within 10 years of retirement to choose an immediate but lower pension in lieu of the vested right to a deferred pension. Also under consideration: a proposal to grant permission for an employee who voluntarily retires

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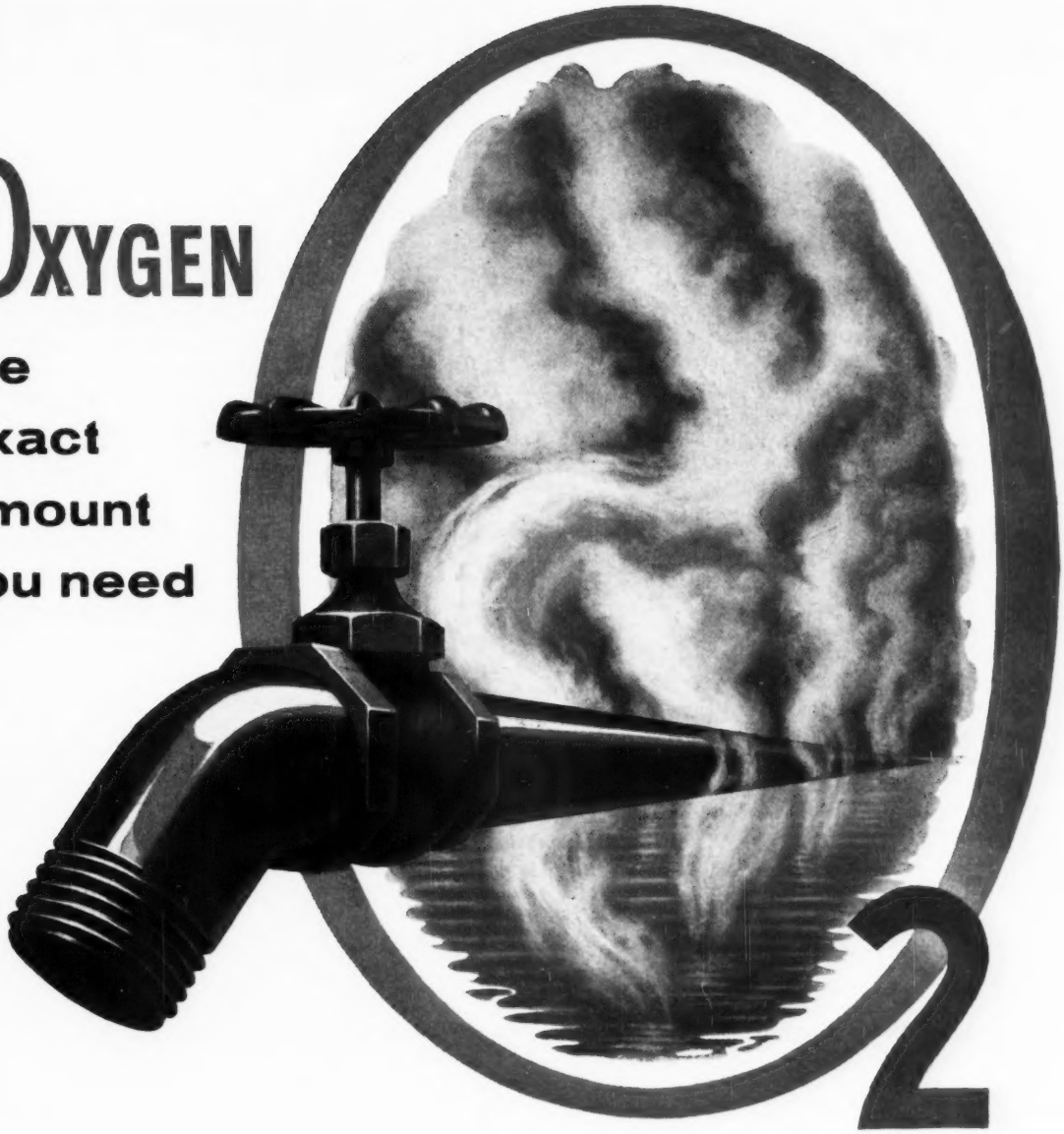

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ADMINISTRATION

under normal age provisions to provide regular monthly income to a survivor by choosing to receive a smaller pension in his lifetime; and a proposal that would provide for computation of pensions on the basis of an average of the employee's 10 years with highest earnings instead of his average for the last 10 years worked.

•

Allied Contract: At Allied Chemical's Semet-Solvay plant (Tonowanda, N.Y.), production and maintenance employees of Local 15-618, OCAW, have ratified a contract providing an average increase of 12¢/-hour this year and 7¢ next year. OCAW won representation from District 50, United Mine Workers, last fall.

LEGAL

Revlon 'Fair Trade' Suit: Revlon Inc. has been named defendant in a civil antitrust action that may add more fuel to the long-smoldering fires of retail price maintenance — "fair trade."

The action, brought in U.S. district court (New York) by Henry Modell & Co. and Par Specialties, Inc., charges that Revlon violated the amended Sherman and Clayton acts by allegedly restraining trade. The suit asks for a permanent injunction and $600,000 in treble damages, plus costs and fees.

The suit, Modell and Par attorneys told *CW*, stems from a previous "fair trade" decision prohibiting a firm from setting minimum prices while acting both as a wholesaler and as a retailer. Revlon is named as a manufacturer and wholesaler and as a retailer in competition with its wholesale customers. It operates a retail salon in New York City.

According to the complaint, Revlon maintained resale prices by the use of "fair trade" contracts, with firms that were Revlon competitors.

Recently, Revlon won an injunction against Modell, a New York retailer, and Par, operator of a toiletries department in a New York retail store, preventing them from selling Revlon products at below "fair trade" prices.

•

Licensing Food Fortifiers: The Minnesota state legislature is considering a food-fortifier licensing bill that

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In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

In South America: Atlantic Refining Company of Brazil, Rio de Janeiro

ADMINISTRATION

could mean additional costs to manufacturers of vitamins and minerals.

The bill would regulate the licensing and distribution of foods fortified with vitamins and minerals. Such foods sold in the state would be registered and charged an annual inspection fee of $5 per product. In addition, applicants for licenses would have to agree to pay for a complete analysis of each product once every six months. Costs would be approximately $15-100/product.

KEY CHANGES

David W. Chappuis to controller, Celanese Corp. of America (New York).

William H. Jackson to director, Spencer Chemical Co. (Kansas City, Mo.).

James M. Murphey, Sr., to vice-president and director, Inland Chemical Corp. (Fort Wayne, Ind.).

John A. Marsh, W. H. Hildebrandt to directors, American Agricultural Chemical Co. (New York).

Arthur K. O'Keefe to president, Texas-U.S. Chemical Co. (New York).

Paul L. Fentress and **Joseph E. Rich** to directors, Dearborn Chemical Co. (Chicago).

Robert L. McNeil, Jr., and **Henry S. McNeil,** to directors, Johnson & Johnson (New Brunswick, N.J.).

E. L. Crowe to controller, Fluor Products Co. (Los Angeles, Calif.).

James W. Swaine to vice-president, General Chemical Division; **Chester M. Brown** to director; Allied Chemical Corp. (New York).

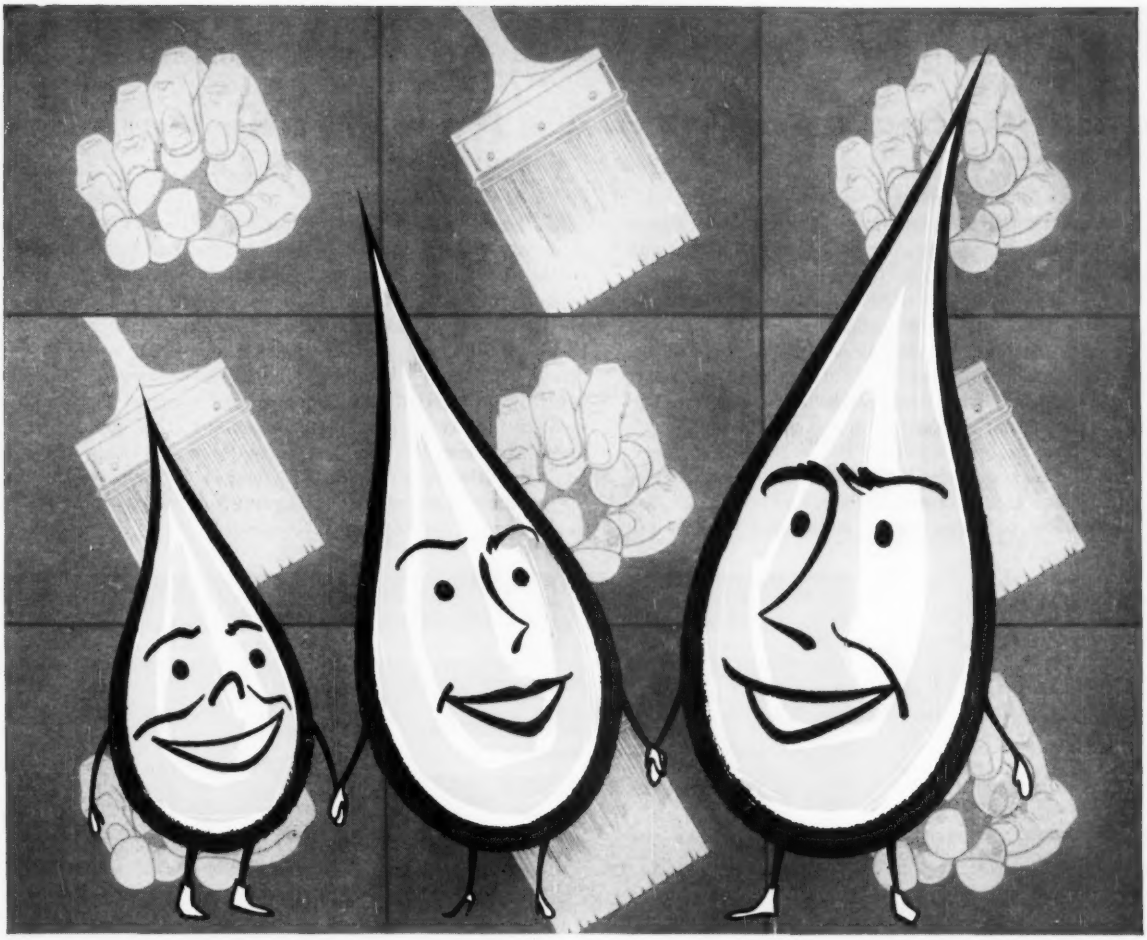
Eugene E. Elzufon to director of research, U.S. Flare Corp. and Assocs. (Saugus, Calif.), subsidiary of Atlantic Research Corp.

John P. Seguin to vice-president, Alco Oil & Chemical Corp. (Philadelphia, Pa.).

DIED

Jack Frye, 54, former president, General Aniline & Film Corp., at Tucson, Ariz.

Harry D. Collier, 82, retired president and board chairman, Standard Oil of California, at San Francisco.



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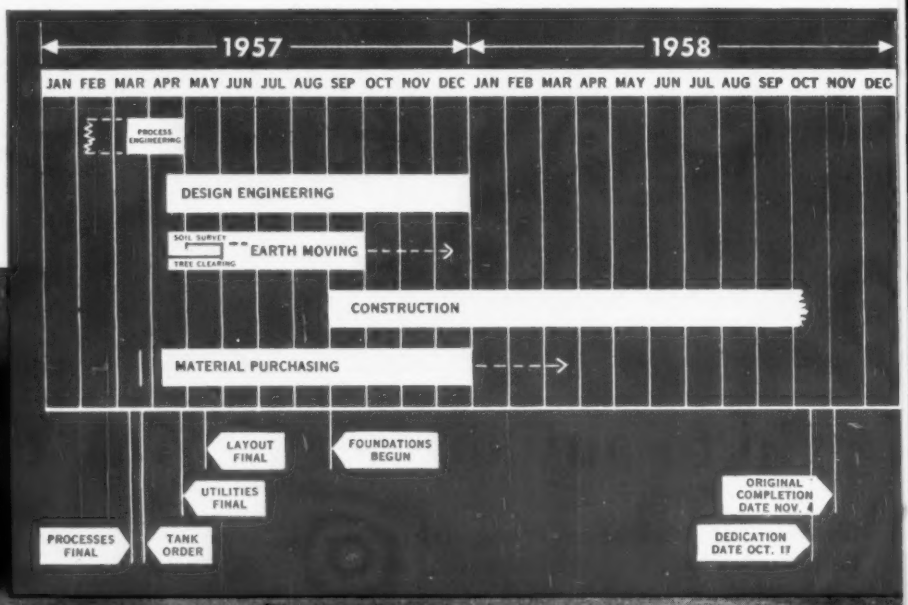
Unique Teamwork

Speeds Completion of B/A's Port Moody Refinery

Foreseeing unusually rapid changes in the West Coast marketing situation, the British American Oil Company in the Spring of 1957 decided a new "grass roots" refinery was required in the Vancouver area by the Winter of 1958. Eighteen months or so is a short time to plan and execute a refinery project. Canadian Kellogg's accomplishment of this unusual speed record is a testimony to the B/A organization and its ability to delegate decision-making. Working with a special team of B/A engineers who could make decisions "on the site", Kellogg completed the project ahead of schedule.

One of the first things Canadian Kellogg required were horses—the only transportation the engineers could use to negotiate the muddy conditions on the site. But a strategically placed drainage and pumping system soon dried the ground and proved so effective that after its installation not one day's labor was lost through wet conditions. Other practical solutions to construction problems, plus the most advanced chemical engineering, have made the investment per barrel capacity of the B/A Port Moody refinery relatively very low.

Right from the start Canadian Kellogg's experience and B/A's cooperation pushed the job ahead of schedule. Of course, B/A and Canadian Kellogg have worked together before. The Port Moody contract was awarded to Canadian Kellogg mainly on past performance . . . this move in itself saved the time and money normally spent preparing and analyzing detail bids. Mutual respect between client and contractor was one of the outstanding factors that contributed to the speedy completion of the project.



Right: *Chart shows rapid construction progress made on the Port Moody project.* Below: *Air view of new B/A Port Moody refinery, Vancouver, British Columbia. Process section, right, is subdivided into five areas: (1) Crude Unit, (2) Catalytic Reformer and Distillate Desulfurization Unit, (3) Utility Plant, (4) Orthoflow® Fluid Cat Cracker, and (5) Alkylation Unit.*

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Market Newsletter

CHEMICAL WEEK
February 21, 1959

Sharp denial that Amoco is losing interest in phthalic anhydride and may switch to other products when its new plant is completed comes this week from Amoco spokesmen. Besides scotching the rumor, Amoco emphasized to *CW* that the new plant has been coming onstream unit by unit as planned, will be fully in operation within the next two or three weeks. However, there's a recognized possibility that should cold weather continue to plague the Midwest, the date for it to be fully onstream might be moved back a little.

Total capacity of the Amoco plant is estimated at 60 million lbs./year—phthalic anhydride, 15 million lbs.; terephthalic acid, 15 million lbs.; isophthalic acid, 30 million lbs. Although a total of eight different acids could be made there, the three phthalic isomers are considered most important.

•

Demand for U.S. naphthalene is firming this week as a result of recent reductions *(CW Market Newsletter, Jan. 31)*. Buyers taking advantage of lower domestic prices (now 5¢/lb.; old price: 7¢/lb.) are refilling new orders with domestic, rather than imported, naphthalene. No price reductions on imported material have yet been announced, although trade observers say the current tab—4¾¢/lb. (cif)—would have to be dropped to about 3¢/lb. Reason for the 2¢/lb. differential: to allow for inland transportation, debagging and melting costs, evaporation losses.

Also boosting current naphthalene sales is the postrecession inventory buildup. Many naphthalene customers last year cut back stocks to reduce storage charges, worked with minimum inventories. But now, with the threat of a June steel strike, many buyers are taking advantage of the low prices to rebuild inventories.

The naphthalene situation was, of course, precipitated by the recent phthalic anhydride price cuts, initiated by Koppers *(CW Market Newsletter, Jan. 31)*.

•

U.S. DDT sellers picked up another 7.4-million-lbs. order—part of a 17.5-million-lbs. contract now being negotiated by the government. Remainder of the contracts will be awarded by the General Services Administration within the next three weeks.

The current orders comprise the second big GSA pesticides deal in the last four months *(CW Market Newsletter, Dec. 6, '58)* destined for use by the International Cooperative Assn. in the worldwide antimalaria program.

Montrose Chemical again picked up one of the largest shares (in the first round of contracts last winter, it won the order for more than

11 million lbs.—about double the next-largest order). The new 7.4-million-lbs. order is divided this way:

Award Winner	Pounds
Olin Mathieson	2,100,000
Montrose Chemical	1,850,000
Allied Chemical, International Division	1,102,000
Pittsburgh Plate Glass (Corona Chemical Division)	1,000,000
Lebanon Chemical	450,000
Pesticide Export Co.	440,000
Diamond Alkali	300,000
California Spray-Chemical	200,000

•

British exports to Communist China increased 120% in '58, compared with '57, according to John Rodgers, parliamentary secretary to the British Board of Trade. British exports to China last year amounted to $74.8 million; imports from China totaled $51.9 million.

Breakdown: chemical exports, $8.4 million worth (about $3 million for chemical elements and compounds, $2.6 million for drugs); chemical imports, $5.3 million worth, including turpentine, rosin, albumen.

Meanwhile, West German trade with China is growing rapidly, is causing concern in British trading circles. But there's no charge of discrimination by the Chinese; Germany's big share of the trade is considered due to purely commercial reasons—lower prices, quicker deliveries.

•

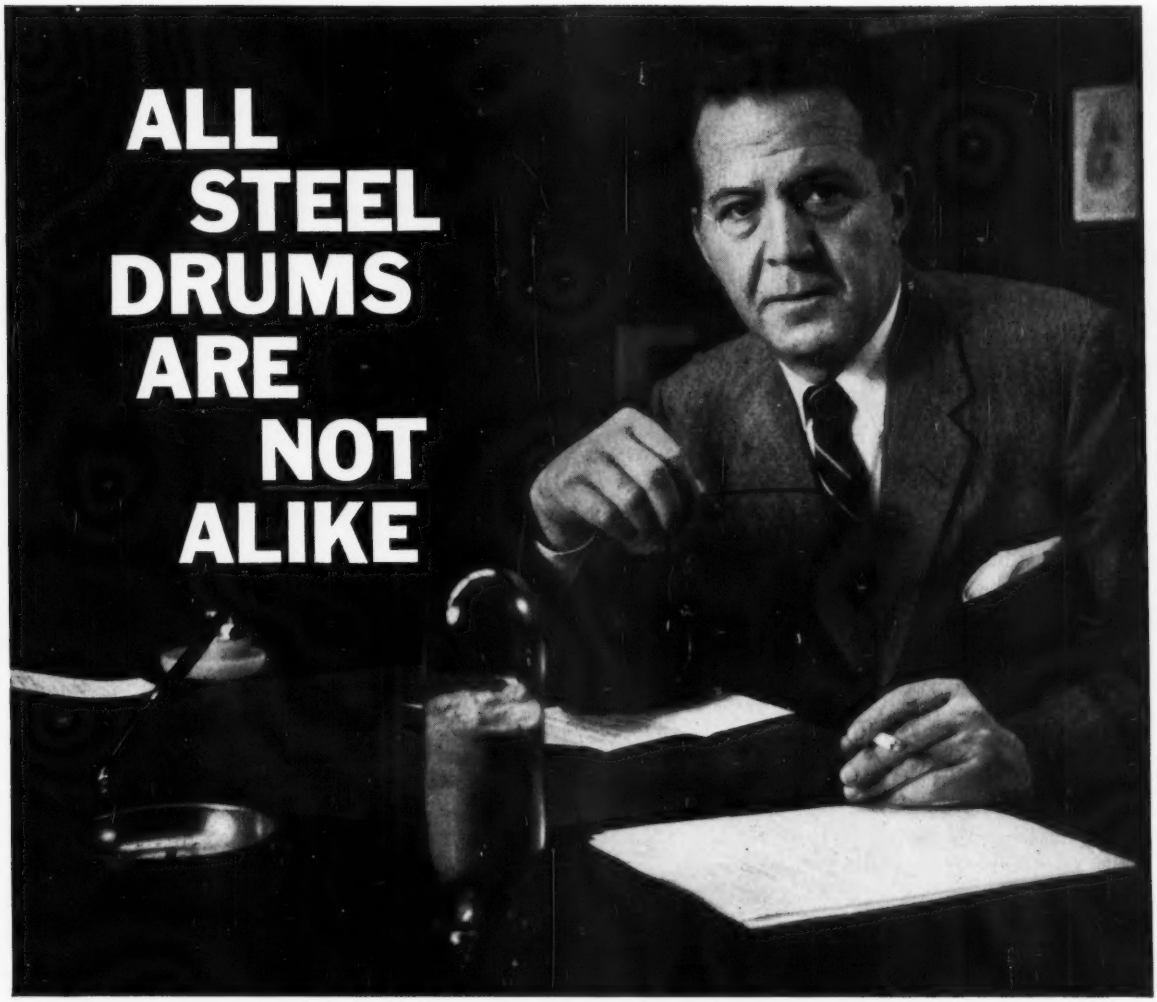
Another 2 million lbs./year of caffeine may hit the world market in the near future. The Brazilian Coffee Institute, trying to cut the nation's coffee surplus, commissioned the Stanford Research Institute to probe technical and economic aspects of nonbeverage uses of coffee, with special emphasis on caffeine production.

SRI developed a process that could easily extract caffeine and other products from Brazil's "expurgo" (not salable) grade of bean. About 2 million bags of expurgo bean are available annually (60 kilograms/bag); caffeine content averages about 1%.

SELECTED PRICE CHANGES—WEEK ENDING FEBRUARY 16, 1959

	Change	New Price
UP		
Carnauba wax, North Country, No. 3, Ceara, crude, bgs., ton lots	$0.01	$0.72
Copra, Atlantic, Gulf ports, c.i.f., ton	5.00	265.00
DOWN		
Lead, metal, prime, pigs, New York	0.005	0.115
Litharge, coml., powd., bbls., c.l.	0.005	0.1325
Orange, mineral, American, bbls., c.l.	0.005	0.1610
Sodium molybdate, anhyd., dms.	0.04	0.92

All prices per pound unless quantity is quoted.



Quality rust-inhibiting coatings plus two extra purchasing advantages make U. S. Steel today's best source for all your steel shipping containers

Dollar for dollar your products are protected better by U. S. Steel rust-inhibited drums. U. S. Steel chemically cleans these drums *after* they are made, then coats them with extra zinc phosphate to give maximum protection. But . . .

At the same time you are getting this maximum protection, you can capitalize on two purchasing advantages, which you get with all U. S. Steel drums and pails:

1. Full, complete line. U. S. Steel offers the widest selection of steel shipping containers on the market. From 2½-gallon pails through 57-gallon drums–plus a complete line of stainless steel containers. This allows you to fill all your needs at one time, in one place, with absolute confidence.

2. Punctual deliveries. Seven convenient plants assure you of a smooth, even flow of containers. Your normal needs are filled without stops and starts, *and* you get quicker delivery on rush orders.

Maximum protection, simplified purchasing, punctual deliveries: you get all these extras at no extra cost. Why not talk over your needs with the man from U. S. Steel?

Factories in: Los Angeles, Calif. • Alameda, Calif. • Port Arthur, Texas • Chicago, Ill. • New Orleans, La. • Sharon, Pa. • Camden, N. J.

PROOF OF U. S. STEEL PROTECTION! **Both these 55-gallon drums** were weathered for 12 months. Rust appeared on the ordinary drum the first week. U. S. Steel rust-inhibited drum—coated with zinc phosphate—shows no trace of rust whatever.

USS **United States Steel Products**
Division of
United States Steel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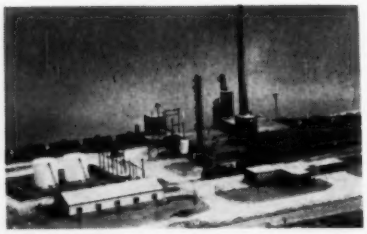

You, too, can take advantage of fast, dependable Spencer Formaldehyde service from Spencer's Calumet City Works (above). Contact Spencer for complete information.

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Right Time for Bag Standards?

Chaos in multiwall bag specifications is costing the chemical industry millions of dollars each year. Thousands of different specifications—some differing by as little as one-half inch in length—are currently in use. The result of this tremendous size proliferation is a CPI bag bill that's $150 million/year—some 5 to 7% more than it need be.

Standardization of bag specifications is, of course, the obvious answer. But it's a solution that's fraught with almost overwhelming difficulties. The bag industry itself is split on the merits of standardization. Chemical packaging engineers and purchasing agents also differ in the enthusiasm they show for standardization proposals. Yet, despite the problems, initial efforts are under way.

St. Regis Paper has just begun an analysis of chemical bag sizes aimed at reducing the number of specifications. Hudson Pulp & Paper, too, is launching a study project. International Paper's Bagpak division salesmen are urging customers to standardize as much as possible on face widths. And Union Bag-Camp ads point up benefits of intracompany standardization.

What is the bag size problem, its causes and its effects? What benefits would standardization offer? What will be the impact of bag palletization? What hope is there for effective standardization? Here are the answers.

Scope: Packaging of chemicals, drugs and mineral products requires some 1.1 billion bags each year. Salt and sugar consumption adds several hundred million more bags to the total. Shipping sacks are offered in five major and many minor types of constructions. Numerous variations in ply weight and moisture barriers are also available. Besides this there are thousands of variations in face and gusset width and length. And there's also a great variety in choice of printing.

One large bag supplier estimates that it offers 1,200 different specifications for fertilizers, 100 for salt, 700 for animal feeds and 200 for carbon

black. In a large chemical firm, as many as 300 specs may be in use.

Even plants within a single company producing the same product at different locations use different sizes.

What has caused the fantastic multiplication of bag specs? Mainly, it's a result of individual differences in product characteristics, sales department requirements, packaging machinery, production rates, distribution systems and customer requirements.

For sales and customer purposes, it is necessary to pack in "round-number sizes" 50-80-100 lbs., for example. Since chemical products vary widely in density, the bag size is adjusted to the desired quantity. Moisture sensitivity and chemical corrosiveness influence type of construction and liners. Production rates and variations in packaging machinery also demand appropriate differences in bag sizes and construction. Rough handling in warehousing and shipping often necessitate special strength.

And industry men cite other factors. For example, bag producers, eager for business, are quick to offer new sizes if a competitive advantage can be gained. And, as one purchasing agent puts it, "there's a certain inertia on the part of consumers to change packaging that has proved satisfactory." The current bag pricing system—due for a change in the near future—also ups the number of sizes.

Costly Luxury? Customization of bags to products is creating a passel of problems for producer and user alike. Manufacturers report that 25-50% of their machine operating time is devoured by changing settings to make different sizes. Purchasing agents complain of tough record-keeping and inventory problems. And some engineers wonder if some products are overpackaged.

Eventually, the problems boil down to economics. Two major bag producers tell *CW* that if the number of specifications could be chopped 50-80%, bag users could save 5-7% on bag costs. In fertilizers, for example, one bag producer's customers could avoid a 7% boost in bag prices if they would make use of one of 200 "standard" specifications.

Cost factors also show up in premium price charges for purchase orders under 40,000 bags. Thus, 2,000-unit quantities carry a $22/1,000-bags premium for mixed carload lots.

Printing is another item upping bag costs. In one firm, the popular one-side/one-color and two-sides/two-color styles carry $5.40 and $7.70 increments over unprinted bags in 40,000-unit quantities. Bag producers believe printing costs could be shaved appreciably if consumers would adopt standard printing formats, change only the product name, shipping and handling data, etc. This, for example, could save 85¢/1,000 bags on two 20,000-unit orders for identical bags shipped in the same car.

Differences in bag sizes also work against efficient use of packaging machinery and warehouse space.

Pallet Impact: Although cost benefits rank high in the lure of standardization, other factors may offer incentive. Take the trend to palletizing bag loads. Palletization offers numerous savings in materials handling. But to cash in on its full benefits, pallet sizes and pallet load patterns must be standardized. To do this, some packers are attempting to standardize on bag width and length and adjusting for product densities by varying the thickness or gusset dimension.

What Hope? Tremendous variations in product characteristics, machinery and handling are the reasons why some bag firms and packaging men are skeptical about standardization. They feel that the problems these factors raise are so big and so numerous that standardization isn't even worth considering.

One firm analyzed a price incentive offered by a competitor for large orders, found that storage rates would cost thrice the promised savings. Nor could it justify price incentives offered for standardized carbon-black bags. Others report that these incentives failed to produce a swing to carbon-black bag standardization.

A few bag companies feel that they might lose "marketing advantages" if standardization came in. And both packaging engineers and bag producers flatly state that bag standardization could never be justified if inferior packaging resulted.

Despite this pessimistic sentiment, many hold some hope for standardization. Bag producers would especially like to see face widths standardized. That's because width adjustments are most costly to make. It would also cut down on paper inventory requirements. Paper weight and

grade standardization would also help, they say. And many feel that the biggest economies at least initially—can be made in intraplant or intracompany standardization. Sack makers report that case histories often show 10-15% savings in total packaging costs.

Considerable hope, too, exists for variable-thickness bags with standardized width and length. This type makes use of special value reducers.

Industry bag norms are another matter. Standardization on a few dozen bags for the entire chemical industry, say packaging men, is an impossibility. But norms for specific products—say, polyethylene, salt, light soda ash, some pigments, alum, etc.—might be feasible. (Standards for cement, flour and sugar have set an attractive precedent.) Fertilizer packaging—the single biggest chemical bag user—may offer some opportunities. But the reductions would be relative—from thousands to hundreds.

There's also a trend to "commodity specification" bags. Under this system, the most popular bags for commodity products (flour, carbon black, cement) are offered as standard, and with a price incentive. New pricing systems, spurred by the Federal Trade Commission, may spur "commodity specs."

In regular pricing methods, prices are figured for each bag size. The new system will encourage "group pricing"—identical prices for a small group of bags of similar size and identical construction.

Whose Task? Opinion varies markedly on who should undertake standardization. The Paper Shipping Sack Manufacturers Assn. feels it's strictly up to the bag consumer, an opinion shared by some but not all packaging and purchasing men. Others believe that trade associations should handle the problem.

Recap: Standardization, apparently offers potential benefits to both bag producer and user—perhaps as much as $10 million/year for chemical makers. But whatever the benefits, they will have to outweigh the problems. And benefits will have to be passed on to bag consumers. In the long run, the incentive offered to users will be decisive. "Give us a saving of $5/1,000 sacks," said one well-known packaging engineer of a major company, "and I think you'll see a lot of standardization."

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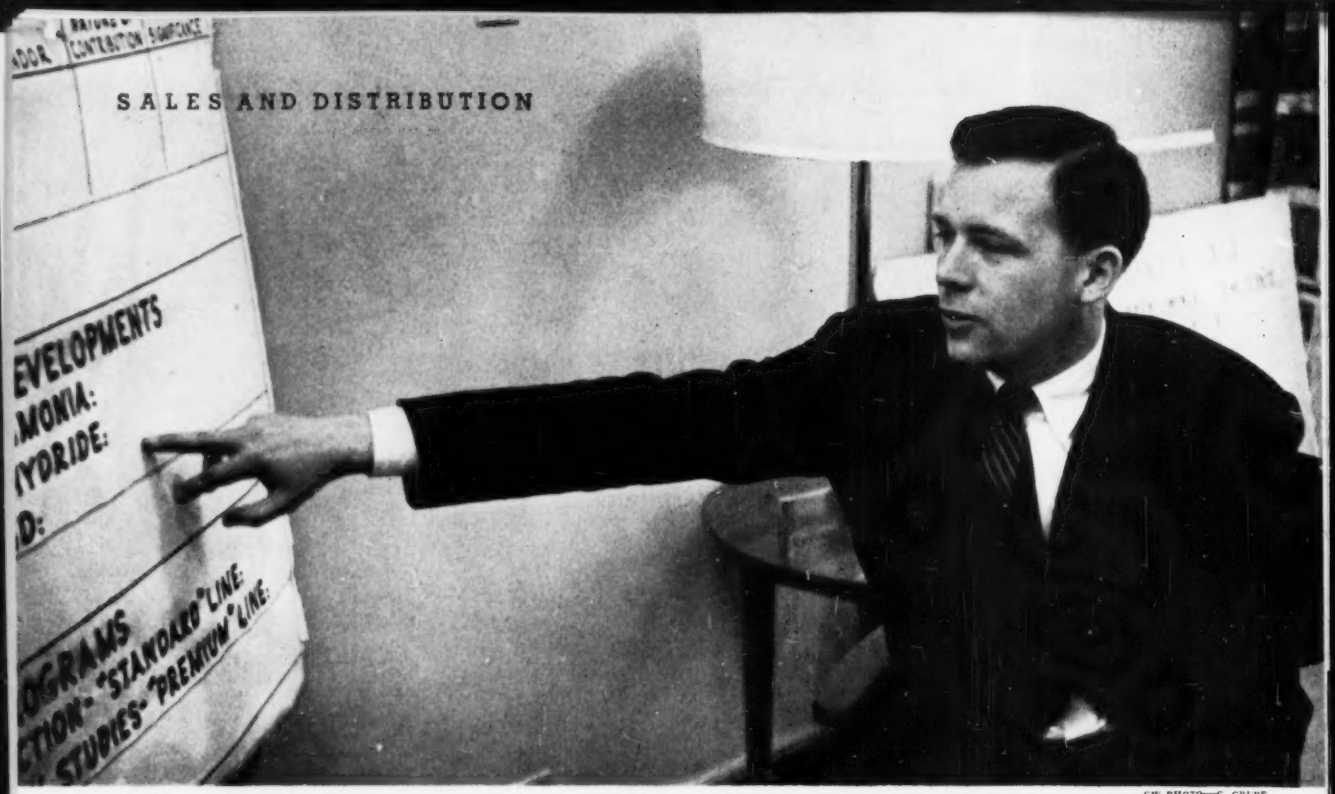

CW PHOTO—C. GRUBE

McKinsey's Taylor: 'In most companies, executives lack effective control of the purchasing function.'

Fingering Today's Top Purchasing Need

"If corporation board members knew how little management control and knowledge they had of their purchasing function, there would be a scandal tomorrow." Choosing those words, Richard Taylor, young and articulate purchasing specialist for McKinsey & Co., set the tenor of an exclusive CW interview last week.

McKinsey, one of the country's top management consulting firms, has been scrutinizing the industrial purchasing function in recent months. It has come up with two big and disturbing surprises:

(1) Management control of purchasing departments and measures of purchasing performance are almost totally lacking in U.S. industry. The chemical business, adds Taylor, is no exception.

(2) Because of this lack of control, substantial contributions to corporate profits are unrealized.

Taylor readily admits the generalizations are sweeping. Yet, that's the pattern that consistently comes to light in McKinsey's studies. What management and purchasing men need, says Taylor, is a system that would measure price, quality, delivery and service performance of the vendor and that would also provide a systematic review of major items on the buyer's shopping list.

The payoff, feels Taylor, would be enormous. For many large companies, savings of millions of dollars per year could result in correspondingly greater increases in profits. Areas for management concentration would be pinpointed. Control would tend to upgrade the quality and effectiveness of purchasing departments. And, because a control system would record and credit vendor service contributions, vendors — assured of being credited with effective aid — would be more aggressive in giving service.

Management today has control of almost all important functions except purchasing, says Taylor. Why not purchasing? The answer, he believes, stems from these factors:

- Purchasing is usually characterized as a clerical function. This distinction still persists among many top corporation officers.
- Top management men, with few exceptions, have not come up through purchasing departments.
- Top executives do not understand the purchasing function.
- Purchasing performance is not as easy to measure as is the performance of other functions, such as sales.
- Purchasing men are "poor salesmen"; they have not promoted and dramatized their function.

At the Helm: Establishing purchasing department controls is a responsibility of the functional head of the purchasing department, subject to review by top management, of course.

Taylor believes that management, largely unfamiliar with purchasing, may be at some disadvantage in establishing a control system, but may successfully resort to the "old standby," comparison of current year vs. the previous year.

System Makeup: Whatever control system is evolved, asserts Taylor, it must show regularly and quickly how well the key elements are handled, focus attention on problem areas and individuals responsible for operating in those areas. The system must provide a "base for understanding" of purchasing and market developments; and it must be a "single, interrelated structure, with reports tailored to the level at which information is needed."

As a starter, Taylor suggests a chemical purchasing control system

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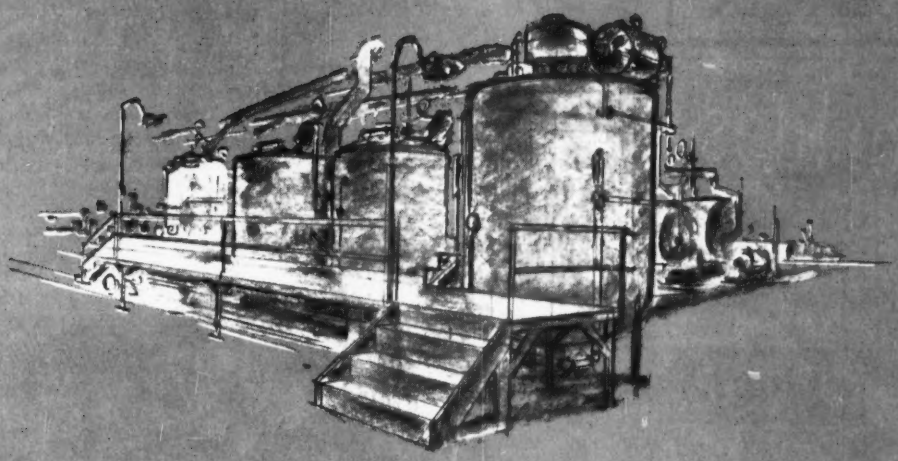

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'Management doesn't understand the profit potential in smart purchasing.'

that keeps tabs on price, quality, delivery and vendor services, and that provides for periodic review of purchasing policies on major items.

Heart of the system: a summary report for management, tabulating those factors. This report would present data for the "latest month" and "year to date." Price data, for example, would be shown as collective planned expenditures vs. actual expenditures, with a separate column to record any variance between actual and planned spending. Similarly, quality performance (value of substandard deliveries as a percent of total value) and delivery performance (value of late deliveries as percent of total value) would also be tabulated. The vendor's contribution and its significance are briefly tabulated.

Second major part of the report, Taylor believes, would be a concise description of major market developments affecting items purchased in quantity. Another section would be devoted to brief reviews of special buying programs—such as cost reduction drives, purchasing training courses, etc.

Supporting the summary report would be a variety of specialized reports for purchasing department management. One, says Taylor, would show commodity costs by products. It would tabulate (for major products) the purchase costs planned for premium, standard and economy grades of materials vs. actual expenditures for the current month and year to date. The variance would afford a measure of price performance.

Another analysis would probe the reasons for cost variance in terms of specification changes, economic conditions, negotiations, etc. Quality and delivery performance would also be treated in separate detailed charts.

Accent on Price: Taylor's control ideas revolve about price, since it's his firm conviction that purchasing agents should focus their major effort on price. Target prices or "theoretical costs arrived at by engineering analysis of what items should cost if produced efficiently and sold competitively" rate high because they are useful in establishing price objectives, he says. Other methods exist for setting objectives.

Price performance can be indicated directly by devising special indexes for key items, comparing target prices vs. actual prices. And they show up indirectly on the master charts if the "planned costs" are weighted to reflect price objectives.

Taylor also urges buyers to compare the issuance of plant requests to buy, a planned schedule of such requests, and the issuance of actual purchasing orders. Such a systematic study, Taylor reports, easily prevents the purchasing department being blamed for other sections' faults.

Taylor feels that assessing vendor service is difficult, may take a year or more. A dollar-and-cents evaluation is not as essential as the record that service is under way. "The supplier that is recorded and credited is the one most likely to follow

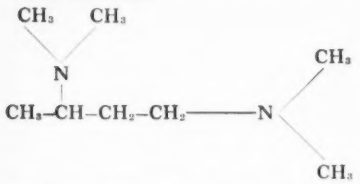
'Price, quality and delivery performance are key purchasing controls.'

Progress Report...

— New di-tertiary amine
— Propylene glycol
— Gas sweetening

New chemical for you to explore

Its name is long, so we'll mention it only once: N,N,N',N'-tetramethyl-1,3-butanediamine.



Some of its physical properties are:

Boiling point, 760 mmHg	165° C.
Freezing point	below −100° C.
Solubility in water, 20° C.	complete

This di-tertiary amine is a colorless, stable liquid, soluble in common organic solvents. It has proved to be a highly active amine catalyst for polyurethane foams, with fast curing rate, and low odor level, producing soft foams.

The new compound should be evaluated as a catalyst for epoxy resins. Its unique structure suggests applications in high energy fuels.

You can get this new chemical from CARBIDE in 55-gallon drums in LCL or carload lots. Technical Information Bulletin F-40392 contains data on physical and physiological properties. For a copy, please check the coupon.

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Propylene glycol, well known for its many important industrial applications, is also supplied by CARBIDE as "U.S.P. grade." The high purity of this product is important to formulators of medicinals and certain food products.

Propylene glycol acts as a softening agent, spreader, and emollient for cosmetics and salves. Many perfumes, dyes, and medicinal preparations are improved by the addition of propylene glycol to their formulas. It is often preferred as a hygroscopic agent, especially for maintaining the moisture content of tobacco products.

Colorless, odorless, and tasteless, propylene glycol U.S.P. is fully miscible with water and extensively used as a solvent, humectant, and preservative. It is ideal for dissolving food flavorings and colorings. In small quantities, it helps packaged foods to retain their freshness and taste appeal.

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Gas sweetening with ethanolamines

Natural gas has taken on greatly increased economic value in the past decade because of its rapidly increasing use as a fuel for both home and industry. As natural gases come out of the ground, however, some contain traces of corrosive acid gases such as hydrogen sulfide. Before the gas can be sent through long distance transmission lines, the acid gases must be removed.

Monoethanolamine reacts with weak acids such as hydrogen sulfide and carbonic acid to form unstable compounds. These decompose when heated, liberating the acid gases and freeing the monoethanolamine for reuse. This provides an economic, continuous process for removing these undesirable materials from the gas stream. Because of this, substantially all gas sweetening in the United States is accomplished by the ethanolamines.

In some plants, monoethanolamine is used along with diethylene glycol for simultaneous desulfurization and dehydration. Besides lowering the hydrogen sulfide content, this mixture also removes water vapor which might form hydrates and thus block transmission lines.

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Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ Bulletin F-40392. ☐ Glycols.
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through on tough problems," Taylor believes.

Beyond Reports: No control system, asserts Taylor, is complete without a provision for methodical review of important decisions. "The top 25 items that may account for 50-60% of all purchases should be reviewed at least yearly."

Purchasing men should watch the "make or buy" situation on raw materials, quickly inform management of new developments. Responsibility for make-or-buy decisions, Taylor emphasizes, aren't placed with the buyer. But he is in an excellent position to counsel management.

Summing Up: Biggest benefit from management control of purchasing, Taylor concludes, is increased profits. In one firm, a purchasing control system with planned goals resulted in before-tax profits equivalent to a sales boost of 20%. And it's Taylor's belief that similar profits may be realized by management that's in control of its purchasing function.

"Control," he reiterates, "packs a big profit payoff."

DATA DIGEST

• **Proteins:** Illustrated 20-page brochure describes characteristics of new alcohol-soluble, water-dispersible protein, Argo Brand Zein G200. Formulations and uses suggested for protective and decorative coatings, shellac replacements, cork bindings. Glossary of proprietary products used in applications is included. Corn Product Sales Co. (New York).

• **Materials - handling:** Semibulk handling system employing aluminum bins (Tote Bins) is described in 20-page illustrated brochure. Tote System, Inc. (Beatrice, Neb.).

• **Corrosion data:** New volume of Dechema - Werkstoffe - Tabelle covers corrosive properties of 46 substances (in alphabetical organization from F to K) on about 100 construction materials. The installment is part of a reference work that will eventually include all major corrosive materials. Dechema (Rheingau Allee 25, Frankfurt 7, Postfach, West Germany).

• **Catalytic lithium:** Four bulletins cover specific aspects of applications of catalytic lithium, lithium metal in organic chemistry, lithium hydride, and butyl lithium. Foote Mineral Co. (18 West Chelten Ave., Philadelphia).

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Chemical Engineer—Graduate Chemical Engineer wanted for heading Process Engineering Department with old established Los Angeles processing equipment manufacturer. Experience in drying, dewatering or heat transfer desirable. Exceptional opportunity with a leading, expanding manufacturer. P-9854, Chemical Week.

Market Development — Opportunity to join Spencer Chemical Company's expanding Plastics Market Development program in a position which will permit the use of sales and technical abilities. We are seeking men who have a chemical or engineering background, and preferably three to five years' experience with thermo-plastics. A working knowledge of polyethylene and nylon is desirable but not essential. A unique opportunity exists to work with a new thermo-plastic-polypropylene. Please send detailed resume to: W. H. Swope, Personnel Manager, Spencer Chemical Co., 610 Dwight Building, Kansas City 5, Mo.

Director of Research with experience in vinyl-preferably vinyl flooring. Knowledge of production techniques wanted by progressive and fast growing manufacturer. P-9975 Chemical Week

Sales Engineer—For well established midwestern engineering and construction firm serving chemical and petrochemical process industries in the U.S. and abroad. Must have necessary drive and experience to coordinate several sales projects simultaneously, including personal contacts with management and engineering personnel of prospective clients to writing detailed proposals and closing of multimillion dollar contracts. Salary commensurate with experience. Send complete resume to P-9852, Chemical Week.

Chemist or Chemical Engineer. Wanted with know-how to design and supervise erection and operation of plant for production USP Aluminum Hydroxide Gels and similar antacids, submit resume of education, past experience and salary requirements. P-9990, Chemical Week.

SELLING OPPORTUNITY AVAILABLE

Salesmen Industrial Chemicals—Our growth company continues to need additional salesmen to sell Water Treating and Petroleum Treating chemicals in our rapidly expanding markets throughout the U.S.A. Good salary plus expenses, profit sharing, and excellent benefit program. Car furnished. On-the-job training program. Two years of college chemistry and a college degree desirable. Industrial Sales experience an asset. Mail resume to Personnel Dept., National Aluminate Corporation, 6214 W. 66th Place, Chicago 38, Illinois.

SELLING OPPORTUNITY AVAILABLE

Complete Line of Corrosion Proof Materials and construction services including acid and alkali proof cements, brick, linings, coatings, plastic ventilation and process equipment. This is a major line and requires technically trained agents who can devote a substantial portion of their time selling to industry and architect engineers. Several protected territories available in East, South and Midwest. RW-9807, Chemical Week.

MANAGEMENT SERVICE

Clark Microanalytical Laboratory—CH. N. S. Halogen, Fluorine, Oxygen, Alkoxyl, Alkimide, Acetyl, Terminal Methyl, etc. by specialist in organic microchemical analysis. P.O. Box 17, Urbana, Ill., Empire 7-8406.

Robinette Research Laboratories, Inc. Industrial Research, Consultation, Technical and Economic Surveys, Product Development, Chemical Market Research. 16 East Lancaster Avenue, Ardmore, Pa. Tel. Midway 2-6457

POSITION WANTED

Sales Engineer Processing Equipment Experience desires sales-service position with manufacturer's agent-representative. Request details. PW-9968, Chemical Week.

CONTRACT WORK WANTED

Custom Grinding-Ultra Fine or Coarse-Specialty or Volume Blending and Grinding service on unit or contract basis. Complete CO^2 installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

Large mfg. of detergents, plasticizers, emulsifiers, pharmaceuticals would like contract work for custom made products. Are also interested in patentees who want their products made and sold. CW-9981, Chemical Week.

SPECIAL SERVICES

Are You in need of custom-made chemicals and industrial specialties? We manufacture the following broad line of products (to your specifications or ours), maintaining rigid quality control and uniformity: Esters, Amides, Sulfates, Hydroxy Fatty Acids, Alkali Sulfide Reductions, Acid Chlorides, D, D.T., Vinyl and Acrylic Emulsions, Alkyl-Silicon Halides, Condensates, Resins, Detergents and many others. Our equipment (all glassed steel, #316 Stainless Steel or better) includes: high-temperature, low-vacuum reactors, filters, homogenizers, condensers, steam ejectos, pumps plus miscellaneous. Our staff is highly qualified; our operating costs are low. Your inquiries will be handled on a confidential basis. Please address SS-9963, Chemical Week.

Resin Markets For Sale. Plasticizer and adhesive marketing opportunities are available through our industrial surveys. Chemical Marketing & Research Co., 10 East 39th Street, New York 16, New York.

FOR SALE

Stainless Steel Spray Dryer, Turbulaire type N-2EBC, Size #425E, electric heating. Perry, 1415 N. 6th St., Philadelphia 22, Pa.

1400 Gal. Reactor, T316 SS, ASME 175# Int. wp, 65# jkt. wp, 20 HP XP agit. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

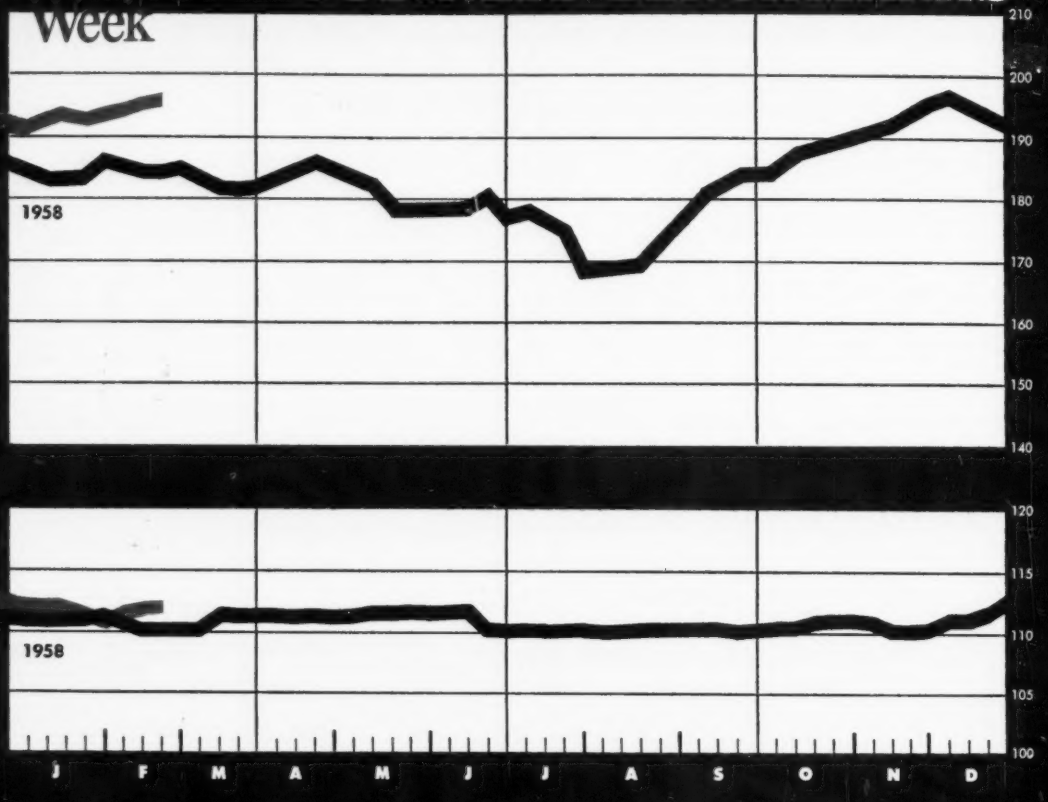
SURPLUS WANTED

A New Way of Saving Money: All types of plant surplus and by-products bought or reclaimed Industrial By-Products and Surplus Co. 40-40 Lawrence Street, Flushing 54, N.Y. INdependence 1-4100.

WANTED/FOR SALE

This Tracer Section can be used whenever you are looking for or offering Equipment, Plants, Supplies, Chemicals, Opportunities, Special Services. The rates are low—just call or write Classified Advertising Division, Chemical Week, P.O. Box 12, N. Y. 36, N. Y., LOngacre 4-3000.

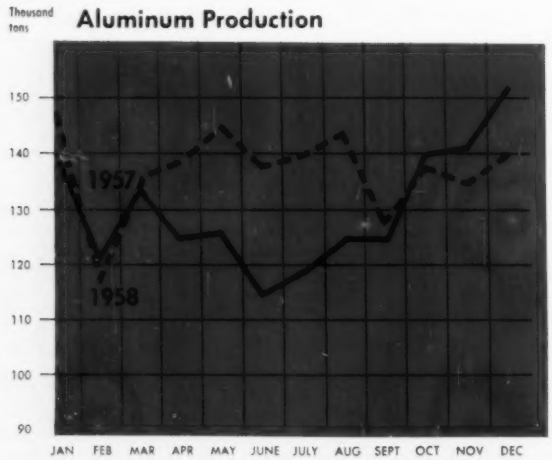
BUSINESS BENCHMARKS

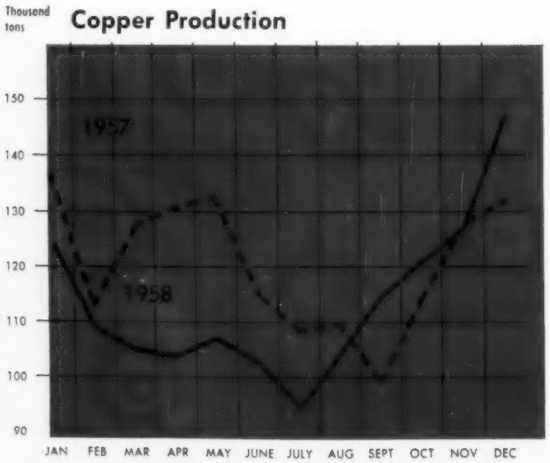


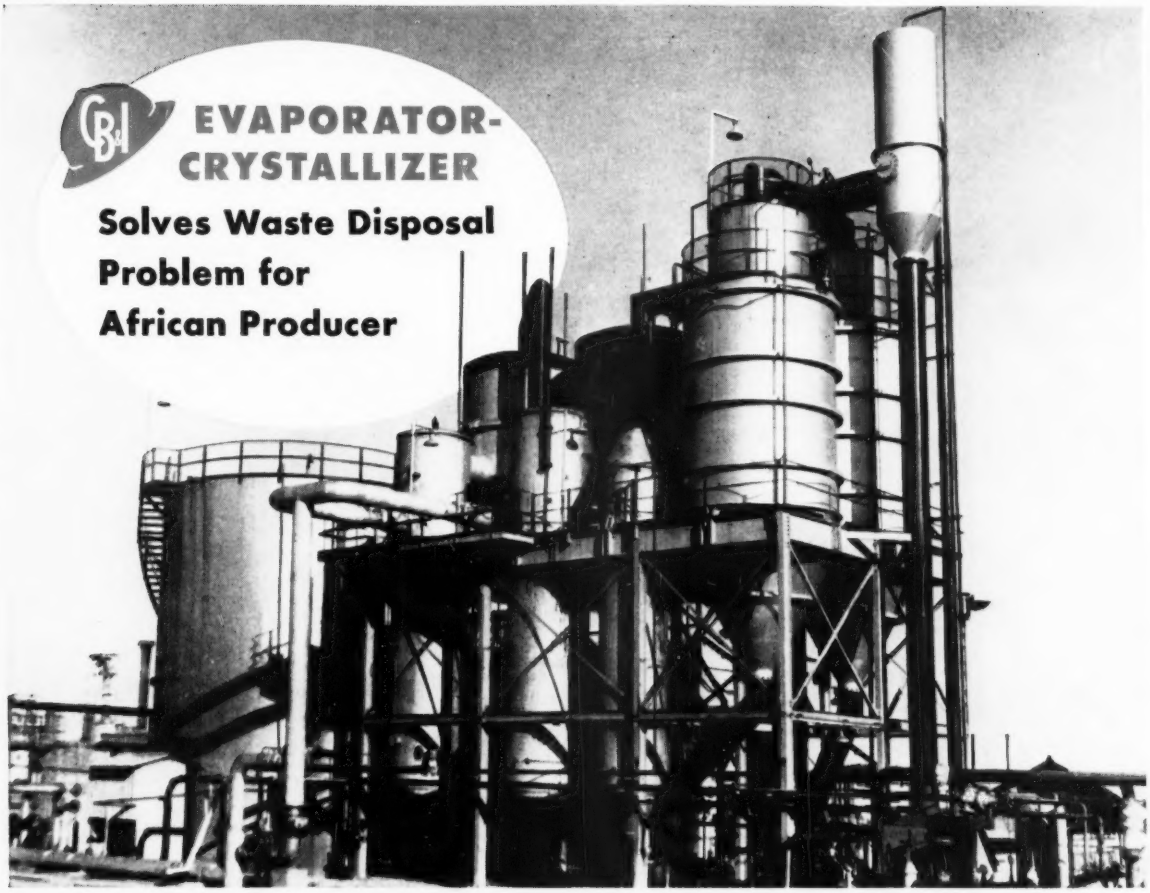
FEBRUARY 21, 1959

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	197.5	196.0	183.5
Chemical Week wholesale price index (1947=100)	111.9	111.8	110.7
Stock price index (11 firms, Standard & Poor's)	48.71	49.06	39.81
Steel ingot production (thousand tons)	2,363	2,288	1,445
Crude oil and condensate (daily av., thousand bbls.)	7,213	7,107	6,858

MONTHLY INDICATORS—Wholesale Prices	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	127.5	127.2	126.1
Chemicals and allied products	110.2	110.0	110.8
Industrial chemicals	124.0	123.7	123.9
Paint and paint materials	120.8	120.8	119.9
Drugs, pharmaceuticals and cosmetics	93.0	93.2	93.6
Fats and oils (inedible)	59.8	61.5	63.1
Fertilizer and materials	107.2	105.3	110.7







Continuous operation reported where tough scale problem was anticipated

This four-body, triple effect CB&I Evaporator-Crystallizer was put to work by the South African Coal, Oil & Gas Corporation to process an effluent waste plant liquor—and to produce crystallized acetate compounds from it.

In designing the unit, CB&I engineers were careful to provide for ease and expediency of cleaning and service . . . because of the high scaling tendency of the material. In addition, the unit was built to operate under a special large volume recirculation technique designed to inhibit scale formation. After many months of operation, the plant reports that loss in production time for cleaning amounts to only 3%. Due to the serious plant operating problem that exists when the evaporator-crystallizer is down the unit runs continuously, even during cleaning.

This report shows why so many CB&I customers are *repeat* customers. CB&I equipment is engineered and adaptable to the most exacting operating requirements. As a result, CB&I customers are accustomed to turning a *profit* from high, uniform crystal production—at low operating cost. Write our nearest office for further details on CB&I-built evaporators, crystallizers and filters.

C46C

Above:
CB&I triple effect evaporator-crystallizer at Coalbrook, South Africa has helped South African Coal, Oil & Gas Corporation to solve a difficult waste disposal problem and to recover crystalline materials which may eventually prove to be a new, marketable product.

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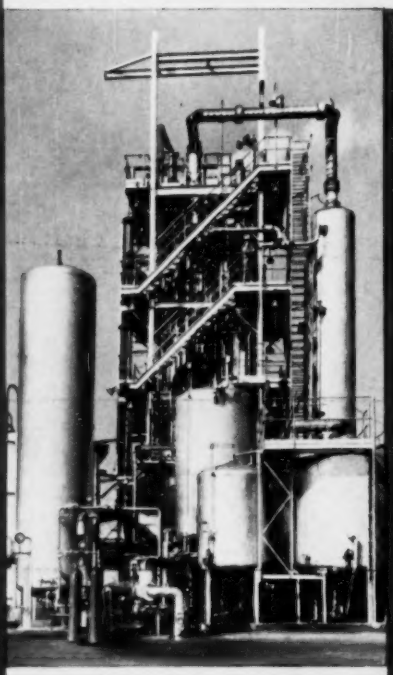
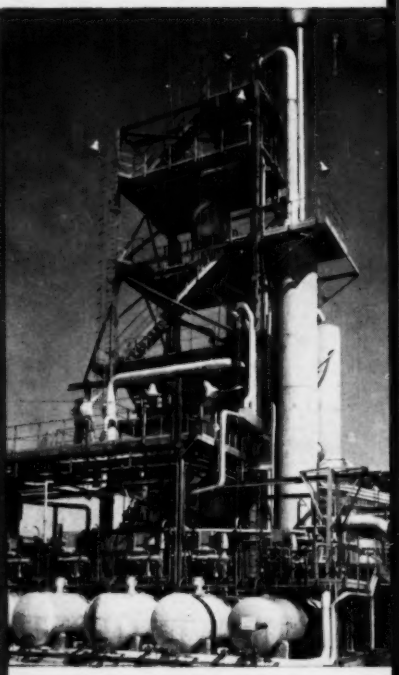


Revamped maleic anhydride plant for Reichhold Chemicals, Inc., Elizabeth, New Jersey.



SD-designed maleic anhydride plant for Cie. Francaise des Matieres Colorantes, France.

Scientific Design's process skill applied to the hitherto difficult technological problems of maleic anhydride production resulted in a special patented catalyst, a radically new reaction system, and an efficient recovery process. Clients profit by substantially increased yield—longer catalyst life—exceptionally high product purity, all incorporated in smoothly operating plants without startup problems. SD is the recognized leader in maleic anhydride technology.

SD's International Achievements in Maleic Anhydride

Reichhold Chemicals, Inc.
Compagnie Francaise des Matieres Colorantes
American Cyanamid Company
Ftalital S.p.A.
Monsanto Chemicals Limited

Request SD "Case Histories" Brochure giving technical and economic information on maleic anhydride.

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